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THE EFFECT OF RADIUM ON CANCER OF THE CERVIX*

An Attempted Correlation Between the Clinical Results and the Histologic Changes With Especial Reference to Alterations in Mitotic Figures

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INTRODUCTION

THIS paper is a preliminary report of a combined clinical and histological study of the effect of radium on carcinoma of the cervix uteri. There are at present two outstanding questions in regard to such carcinomas; namely,

1. Why is radium treatment so successful in certain advanced cases and so unsuccessful in apparently similar ones, and
2. Should radium be applied in one large dose for a short period of time or in small or divided doses over a long period of time?

It was with the hope of gaining some information on these two points that this piece of work was undertaken.

The methods employed were essentially the same as those used by others. The present report is based on the findings in only five cases but the practical difficulties in such a study are so great, and the duration of time necessary to determine the final results is so long, that it was decided to publish such data as were available at this time. At present a continuation of this study is being carried out but another two years must elapse before any comparable conclusions can be drawn.

HISTORY

Regaud[1] and his associates showed the effect of x-ray treatment on the egg of a chicken and demonstrated the degenerating radiated cells, observed during the period of cells in division, which "seem to correspond (after their number and their situation) to pre-existing mitoses, authorizing one to think that the disappearance of mitoses is explained not only by the suspension of each cellular reproduction but even by the direct action on the cells in the course of division—other cells die in the course of degenerative karyokinesis; others, without doubt the less injured, can divide normally in appearance but give birth to monstrous elements." They believe that the "karyokinesis is the moment of least resistance of the cell to radiation".

Wood[2] in 1920, x-raying mouse carcinoma in tissue culture, showed that "mitotic figures in the nuclei were found to be very scarce, though some of the treated tissue in which no mitoses were found grew well. The finding of mitotic figures was not, therefore, always an indication of the power of the tissue to grow when inoculated into mice. The probability is that the cells are much more sensitive in the mitotic stage, only those in the resting stage survived and were able to grow." In conclusion six in his article he states that the "absence of mitotic figures after roentgen-ray treatment is not an indication of the lack of ability of the cell to grow in the animal body". He supports Regaud and his associates in the theory that the cell during mitosis is most vulnerable to x-ray treatment and is not in agreement with the ideas of Strangeways and Canti, as will be shown.

Strangeways[3], in 1925, as a result of his experiment to determine the effect of x-ray on cells undergoing division in tissue cultures of the embryonic fowl and in the embryo white in the unopened shell, believes that "these experiments indicated that even small doses had a pronounced inhibitory effect on cell division, and that it prevented new cells from coming into mitosis. Such small doses caused a definite retardation of the different phases of mitosis in those cells which had already begun to divide before the commencement of irradiation. It was found that there was no definite evidence that cells in actual mitosis were more vulnerable than those in a vegetative state."

Canti and Spear[4], in 1925, in discussing the biological action of gamma-ray radiation on tissue cultures, stated that the "most striking among these observations was the absence of mitosis, which was observed as soon as the radium was removed after twenty-four hours in situ.—Cells in mitosis divided in what appeared to be normal fashion, and the daughter cells developed into full-sized apparently normal vegetative cells and did not again go into mitosis."

Strangeways[3] and Canti[4] and their associates believed that the cell was most vulnerable just before going into mitosis, which is contrary to the belief of Wood and Regaud.

Levitt[5], of St. Bartholomew's Hospital, dis-

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cussing the work of Alberti and Politzer who worked on cultures of salamander larvae, states that they obtained results which corresponded very closely with those of Strangeways. They described three stages in which the radiation effects were manifest; the first a period of about six hours in which there were degenerative changes in the nuclei of the irradiated cells terminating finally in the complete cessation of mitosis and in the second stage mitosis was completely absent and this stage lasted about three days; at the beginning of the third stage mitosis recommenced but showed marked abnormality. The irregular mitosis reached the maximum about the ninth day and gradually thereafter returned to normal. The most interesting part of their work was an experiment to determine the effect of a further radiation while irregular mitoses were at a maximum. They found that a second dose at the height of irregular mitosis had the effect of a dose about two and a half times as great as it would otherwise have had. Apparently radiation of tissue cultures shows that it will constantly check mitosis and will cause a period of absent mitosis and that upon the recurrence of mitosis the tissues are apt to be abnormal and monstrous.

Donaldson and Canti[6] in 1921, working with cases of cancer of the cervix and using radium element filtered so as to give a minimum of beta radiation and a maximum of gamma radiation in doses from 1200 to 4000 m.c. hours, found that clinically with the larger dose the hemorrhages, vaginal discharge and ulcerations nearly always disappeared and that in a great many instances the tumor itself vanished from the cervix and vagina. Their report of the histological findings of cancer tissue removed following the treatment was extremely interesting and it is here quoted in full:

> "In the sections taken on the days immediately following irradiation considerable changes were noted. In some cases these were more marked than in others, probably owing to the proximity of the source of irradiation. In a section taken immediately after removal of radium the appearances were not dissimilar to those in the section taken before treatment—namely, normal mitotic figures were present in small numbers, and degenerate mitoses were occasionally seen. In a section taken on the third day, mitotic figures were much more numerous, normal prophase and metaphase were frequently seen, together with undoubted mitoses showing an irregular arrangement of chromosomes and occasionally multipolar-spindle figures. These changes were still more marked on the fourth day when there was hardly a cell which did not show abnormalities of one kind or another. These abnormalities consisted of (a) Abnormal mitosis, (b) Necrosis, (c) Increase in size of the cell.
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> (a) *Abnormal Mitosis*—No normal mitoses were seen; almost 50 per cent. of the cells showed absence of nuclear boundary and of these a large number showed degenerative mitoses. Prophase was occasionally seen, metaphase was abundant, but the later stages of division were not observed. Multipolar division was present, though not frequent, but cells showing granular and fragmented chromosomes were seen in large numbers. Some of them showed well formed spindle figures, but others showed only occasional scattered threads, the nature of which was doubtful, and we were unable to decide whether these latter cells were undergoing mitosis or were in a process of dissolution, especially as the cytoplasm of some of them was broken into droplets. In other cells, the chromosomes had almost entirely disappeared, the spindle figure alone being seen.
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> (b) *Necrosis*—In some areas the tissue as a whole had undergone coagulation necrosis, there being complete loss of power to take up nuclear stain, while the general structure of the tissue was maintained. These areas, we believe, were in close proximity to the radium.
>
> (c) *Increase in Size*—The remainder of the new growth cells showed some increase in size compared with those in the original growth, and further, their nuclei were enlarged.
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> "*Later Changes.* From the seventh day onwards no mitoses of any kind were observed, an observation which would seem to be of considerable importance. The nuclei appeared to be broken up, the chromatin being distributed in the cytoplasm as droplets or irregular particles; in some cells, however, nuclear staining was no longer visible.

These findings check very closely with the experiments of Alberti and Politzer quoted above and show that cell division ceases for a period of time and recommences with greatly abnormal mitotic figures.

Canti[7] believes that there are two actions on cancer cells, the direct and the indirect. He is of the opinion that there is no question but that some cells are destroyed at once but there is considerable evidence that many of the cells go on living for a time and finally die out. There apparently is a delayed "lethal effect" without evidence as to what causes it. Experimental attempts by Strangeways and Hopwood[7] to kill embryonic tissue by direct radium action showed that 100 times a skin dose does not cause immediate death of all the cells in vitro. They do not believe that fibrosis is the cause of the disappearance of the tumor, for this is a late manifestation, but suggest the possibility of blood vessel changes, such as thrombosis, being the potent factor. The effect of radiation from a central applicator decreases enormously from the central source so that some cells at the periphery are not affected at all. This is shown to be true experimentally for at a certain distance with a minimum amount of radiation the tissue culture was unaffected no matter how long the radium was left near it. Canti[7] believes that the most pressing problem from a clinical viewpoint is whether it is better to apply a large intensity of radiation for a short time or a smaller intensity for a long time. Inasmuch as there is a recurrence of mitotic figures, even though abnormal, which probably means that with a single dose over a short period of time all the tumor has not been killed at once, and inasmuch as Alberti and Politzer have proved the much greater efficacy of radia-

tion at the time of recurrence of this phenomenon, Donaldson is now treating cases with a small amount of radium divided into many applicators and implanted throughout the malignant tissue over a long period of time. If, however, the hypothesis is true, that cell division is checked by even small doses of radiation in 24 hours, it does not seem probable that with radiation present continuously, a period of abnormal cell division would ever be reached. Therefore, perhaps a method of treatment which allowed abnormal cell division to occur and the radium to be reapplied at that time might be even more efficacious. The ideas of treatment of Donaldson* and Canti have considerable experimental evidence in their favor and their results following this method of treatment will be looked for with interest. Interestingly enough Donaldson* states that a comparison between his first series in which he used 24 hour radiation treatment and his present series using a small dose for 144 hours, showed a 19.6% increase in favorable results for the 144 hour series at the end of a year.

In 1927, Dustin carried out a series of observations on six cases of carcinoma of the cervix following radium. He performed frequent biopsies and made a careful histological study of the specimens. He distinguished three phases. In the first, there was a more or less rapid decrease in the number of normal mitotic figures with a simultaneous increase in the number of pyknoses. In the second phase, the abnormal mitoses showed an increase of varying duration. During the third phase, there was complete cessation of normal cell division and at the same time, a rapid fall in the number of abnormal mitoses, sometimes followed by a second slight rise. At this time there was histolysis of the tumor.

MATERIAL AND METHODS

In an attempt to check the clinical observations of Donaldson and Canti as to the effect of radiation on tumor tissue, five cases at the Collis P. Huntington Memorial Hospital that were considered very advanced were given the treatment usually outlined for this type of case and specimens were removed daily until no further tumor tissue could be removed.

Case No. 1. H. H. No. 28-100, treated on February 6, 1928. This patient 47 years of age, regarded as a I D case according to the classification of the American College of Surgeons, was given 2940 m.c. hours of radiation. The tumor was very extensive, being an ulcerative new growth with submucous extension and with definite broad ligament invasion. The radium was placed against the cervix and was screened by 2 m.m. of lead and a rubber finger cot. The pathologic report No. 28-53 showed squamous cell carcinoma of high malignancy. Specimens were removed starting 24 hours after treatment and every 24 hours for seven days. The first change that was noticed in the tumor in gross was its smooth appearance after 24 hours of radiation and the greenish gray necrotic tissue on the outside of the tumor. Small pieces of tissue for histologic examination were removed with a tonsil punch. On the fourth day the tumor was definitely smaller in size and seemed to be shrinking rapidly. On the sixth day there was considerable difficulty in obtaining a specimen. On the seventh day a specimen was removed and the patient discharged herself from the hospital against advice. This patient died August 2, 1928, or seven months following radium treatment.

Case No. 2. H. H. 28-134, treated on February 18, 1928. This patient, age 54 years, showed infiltration in both broad ligaments and a large metastatic nodule in the recto-vaginal septum which was entirely submucous. Patient was placed in group I C. Five 1.3 m.c. gold seeds and three 1 m.c. gold seeds were placed in the periphery of the tumor and she was given the same type of lead screened radiation amounting to 3090 m.c. hours, the radium being left in place against the cervix for six hours. The pathologic report No. 28-108 showed squamous cell carcinoma of high malignancy. At the end of 24 hours specimens were removed and again the same gray slough and smoothness of the tumor was noticed. On the third day a note states that the tumor had shrunken considerably in size. On the fourth day the tumor was about one-half its original size. On the ninth day there was great difficulty in obtaining a specimen because the tumor had nearly disappeared and it was covered with pink fresh looking granulation tissue. No further treatment was given the patient in this hospital, but in another institution she was given two x-ray treatments over the pelvic organs. She died on March 17, 1929 or thirteen months after the original treatment.

Case No. 3. H. H. 28-101, was treated on February 11, 1928. The patient, age 46 years, showed a recurrence in the vaginal vault with a mass in the pelvis behind the recurrence, following a complete hysterectomy done on June 10, 1927 for carcinoma of the cervix. The present treatment was given seven months following the hysterectomy. She was grouped as a 2 D case. The nodule in the vaginal vault measured 2 x 3 cm. There was a large hard mass directly behind this nodule in the pelvis with complete fixation. She was given seven .5 m.c. gold seeds which were placed in the tumor mass and 2525 m.c. hours of so-called gamma treatment or radium screened by 2 m.m. of lead plus a finger cot, the radium remaining in place against the vaginal growth for five hours. The pathologic report No. 28-70 showed high malignancy. Specimens were removed 24 hours after the treatment and each day until the ninth day. On the fourth day the tumor was considerably harder and smaller. On the sixth day there was a more noticeable change, the tumor was harder, there was less discharge and more difficulty in obtaining a specimen. On the eight day there was some slough noticed at the apex of the vagina and also some pink granulation tissue. On the ninth day the patient was discharged. It had been increasingly difficult each day to obtain specimens. Three months later on examination there was still a nodule in the vault of the vagina and behind the mucous membrane other nodules could be felt which connected with the large mass in the pelvis. The lesion had shrunk markedly. She was then given a second heavily screened radium treatment and a deep x-ray series without effect. She died September 12, 1928 or seven months after treatment.

Case No. 4. H. H. 28-102, age 50 years, treated February 7, 1928. The cervix in this case was ulcerated, cratered and extended submucously in all directions and there were definite thickenings in both broad ligament regions which were taken to be extension of malignant disease. She was grouped

as 1 D. In this instance ten 1.2 m.c. gold seeds were placed in the periphery of the growth and she was given in addition 3090 m.c. hours of lead screened radiation. The screening was 2 m.m. of lead in a finger cot. The radium was kept in place against the cervix for six hours. The report from the laboratory No. 28-55 showed squamous cells carcinoma of medium malignancy. At the end of one year this patient had gained 14 lbs.—examination showed that most of the cervix had been destroyed. No evidence of growth could be made out by vaginal or rectal examinations. In this case specimens were removed starting 24 hours after treatment. The same greyish slough and smoothness of the tumor was noticed at the end of 24 hours. On the third day after radiation the tumor was noticeably smaller. On the sixth day there was some difficulty in obtaining a specimen and some tissue looking like granulation tissue could be seen. On the eighth day the tumor felt very hard with a soft slough in the center and there was considerable difficulty in obtaining anything except a piece of sloughing tissue. On the ninth day there was definite cavity formation in the apex of the vagina and on the tenth day the tumor was so shrunken that specimens were removed with exceeding difficulty. She was seen on November 7, 1929 or 21 months following the treatment. The cervix was destroyed, no masses could be found and although there was a slight amount of fixation by rectum nothing suggestive of carcinomatous mass in either broad ligament could be felt. She was definitely reported as alive and well on July 1, 1930, or 2 years and 5 months after treatment, but the patient was not seen or examined.

Case No. 5. H. H. 28-175, treated on February 14, 1928. This patient, age 49 years, was regarded as a I C case. There was a definite mass that could be felt in the left broad ligament. The lesion in the cervix was ulcerative and extended submucously in all directions. Eight 1.3 m.c. gold seeds were placed in the periphery of the cervix and she was given 2985 m.c. hours of radiation, the radium was screened by 1 m.m. of silver and placed in the cervical canal. This was the first patient in whom the canal could be located well enough to use a silver applicator. She had a definite pyometrium, about an ounce of foul smelling pus being evacuated while dilating the canal. The radium in the silver applicator stayed in place for five hours. The pathologic report No. 28-82 showed squamous cell carcinoma of high malignancy. Twenty-four hours later a specimen was removed. There is no note about the usual greyish slough. On the fourth day a note states that the tumor was apparently shrinking. On the fifth day the first difficulty was experienced in obtaining a specimen. On the seventh day it was quite difficult to obtain any tissue and a note was made questioning whether this specimen would show any tumor tissue. The tumor was hard, the instruments sliding off very easily. On the ninth day it was extremely difficult to obtain a specimen and the tumor itself had become increasingly hard. This patient was seen on July 31, 1930 with no sign of tumor present. The cervix had been destroyed, the pelvis was free and no masses or thickening could be felt. This patient has lived two years and five months following her treatment and at the present time would be called free of disease.

We therefore find that a few outstanding facts were evident during the removal of specimens. All patients had advanced disease. Three of the patients were given a treatment with radium using a filtration of 2 mm. of lead plus gold seeds. In one case the lead filter alone was used and in the other a silver filter of 1 m.m. and gold seeds were used. In four out of five a greyish slough was noticed over the tumor within 24 hours. Shrinking of the growth was noticed within four days in all patients resulting in considerable difficulty in obtaining specimens toward the last. The tumors became extremely hard about the seventh or eighth day. In three instances pink, fresh looking tissue was noticed presenting from behind the sloughing tumor tissue. Two of these patients, although advanced, are alive and well without evidence of disease at the end of two years. The other three have died in periods up to thirteen months following radiation.

MICROSCOPIC EXAMINATION

The specimens removed at biopsy were fixed in formalin and embedded in paraffin. The sections were stained with hematoxylin and eosin. The slides were studied microscopically not only for the general histological picture but also with regard to the number and type of mitotic figures in the tumor cells.

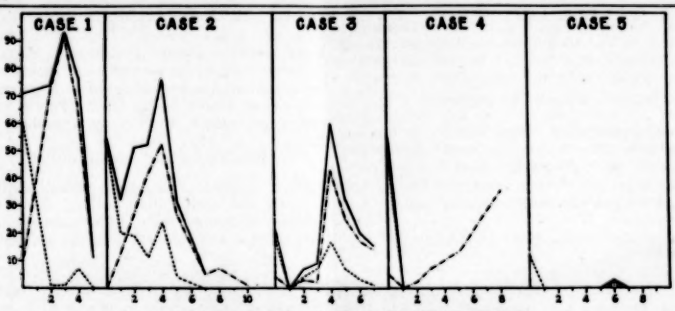
In this study of mitotic figures, we followed the method employed by Dustin. The number of mitoses in twenty oil immersion fields (2 m.m. oil immersion objective, primary magnification 90, and 7x ocular) were counted in each specimen. Each such field was picked so as to contain only cancer tissue. While the figures so obtained are not accurate regarded as absolute numbers, such figures do have significance in comparing one specimen with another. The mitoses were divided into two types—normal and abnormal—as was done by Dustin, and each type was enumerated separately. The abnormal mitoses showed an irregular migration of the chromatin toward the centrosomes. Often some chromatin remained at the equator of the spindle after other fragments had reached the centrosomes. Sometimes the spindle could be made out only with difficulty and bits of chromatin were scattered haphazard in the cell. Such changes have been described by others following x-ray and radium treatment and in addition by Mottram in tissue cultures grown under high carbon dioxide tensions.

In the following descriptions, a brief note on the histological picture of each specimen is given. The number and type of the mitotic figures are given in the text and also in the chart.

Case 1.

First biopsy. Before treatment. Squamous cell carcinoma with a considerable number of pearls. Some multiple mitoses and multi-nucleated tumor cells. Marked infiltration with polymorphonuclear leucocytes and eosinophiles, especially in the pearls. In the stroma, numerous eosinophiles and some polymorphonuclears.

Mitoses: normal, 61; abnormal, 10.



Abscissae, days with reference to the time of treatment, 0 being before treatment and the other figures the number of days after treatment; ordinates, the number of mitotic figures.

——— = total number of mitoses
- - - - - = number of normal mitoses
—·—·— = number of abnormal mitoses

Cases I, II and III are dead and Cases IV and V are alive and apparently well 2 years and 4 months after treatment. The graphs show the different reactions of mitoses following treatment with radium.

Second biopsy. Two days after treatment. Necrosis in the centers of the cords of tumor cells with a marked infiltration of polymorphonuclears. Many fewer eosinophiles. Polymorphonuclears also in living tumor tissue and in normal epithelium. Some atypical mitoses in the latter.

Mitoses: normal, 1; abnormal, 74

Third biopsy. Three days after treatment. General picture unchanged.

Mitoses: normal, 1; abnormal, 92.

Fourth biopsy. Four days after treatment. Fairly numerous multinucleated tumor cells and cells with large, atypical nuclei. Necrosis of tumor cells and invasion by polymorphonuclears. Many eosinophiles in stroma. Normal epithelium infiltrated with polymorphonuclears. In normal epithelium, three normal and five abnormal mitoses in twenty fields.

Mitoses: normal, 7; abnormal, 66.

Fifth biopsy. Five days after treatment. Tumor in the stroma of a polyp covered with normal epithelium. Some of tumor cells large with large nuclei. Considerable amount of keratinization and invasion by polymorphonuclears. Some necrosis of tumor cells.

Mitoses: normal, 0; abnormal, 11.

Sixth biopsy. Six days after treatment. No tumor present.

Seventh biopsy. Seven days after treatment. No tumor present.

Case 2

First biopsy. Before treatment. Definite pearl formation in places; in others type of epithelium resembling gland epithelium growing in cords. No multiple mitoses or tumor giant cells. Stroma infiltrated with plasma cells, polymorphonuclears and lymphocytes.

Mitoses: normal, 54; abnormal, 0.

Second biopsy. One day after treatment. Necrosis and acute inflammation. Epithelium squamous in type with a considerable number of pearls. Some of blood vessels thrombosed.

Mitoses: normal, 20; abnormal, 12.

Third biopsy. Two days after treatment. No change.

Mitoses: normal, 19; abnormal, 32.

Fourth biopsy. Three days after treatment. Necrosis of single cells and groups of cells with an infiltration of polymorphonuclears. Some large and irregularly shaped nuclei in the tumor cells. Pearls larger than before. Lymphocytes and plasma cells in stroma. Some thrombosed blood vessels.

Mitoses: normal, 11; abnormal, 41.

Fifth biopsy. Four days after treatment. More extensive keratinization and infiltration with polymorphonuclears.

Mitoses: normal, 24; abnormal, 52.

Sixth biopsy. Five days after treatment. Tumor cells more differentiated and greatly increased in size. Nuclei correspondingly larger and sometimes irregular in shape. Some of the cells vacuolated and majority of these invaded by polymorphonuclears. Eosinophiles and plasma cells in the stroma.

Mitoses: normal, 4; abnormal, 27.

Seventh biopsy. Six days after treatment. Unchanged.

Mitoses: normal, 0; abnormal, 5.

Eighth biopsy. Eight days after treatment. Tumor cells and their nuclei still large. Majority of tumor cells invaded by polymorphonuclears. Plasma cells and eosinophiles in stroma.

Mitoses: normal, 0; abnormal, 7.

Ninth biopsy. Ten days after treatment. Tumor cells often with giant nuclei. Cytoplasm keratinized and frequently invaded by polymorphonuclears. Stroma dense and hyalin and in it a few polymorphonuclears and foreign body giant cells.

Mitoses: normal, 0; abnormal, 1.

Case 3

First biopsy. Before treatment. Squamous cell carcinoma with no differentiation. Some multiple mitoses. Numerous plasma cells in stroma.

Mitoses: normal, 18; abnormal, 4.

Second biopsy. One day after treatment. Marked infiltration of tumor cells by polymorphonuclears and of stroma by polymorphonuclears and plasma cells.

Mitoses: normal, 0; abnormal, 0.

Third biopsy. Two days after treatment. No change.

Mitoses: normal, 4; abnormal, 2.

Fourth biopsy. Three days after treatment. Necrosis and acute inflammation. A few tumor cells with vacuoles and hyalin droplets in cytoplasm. No tendency to differentiate. Polymorphonuclears and plasma cells in stroma.

Mitoses: normal, 2; abnormal, 7.

Fifth biopsy. Four days after treatment. Many tumor cells vacuolated and with hyalin droplets in cytoplasm. Considerable number of necrotic cells invaded by polymorphonuclears. Some multiple mitoses. Polymorphonuclears and plasma cells in stroma.

Mitoses: normal, 17; abnormal, 43.

Sixth biopsy. Five days after treatment. No change.

Mitoses: normal, 7; abnormal, 25.

Seventh biopsy. Six days after treatment. Essentially unchanged. Some cells of considerable size.

Mitoses: normal, 3; abnormal, 17.

Eighth biopsy. Seven days after treatment. No change except slight increase of stroma.

Mitoses: normal, 1; abnormal, 14.

Ninth biopsy. Eight days after treatment. No tumor in specimen. Granulation tissue containing polymorphonuclears and plasma cells.

Tenth biopsy. Nine days after treatment. No tumor. Necrotic and living granulation tissue.

Case 4

First biopsy. Before treatment. Fairly well differentiated squamous cell carcinoma with a considerable number of pearls. No multiple mitoses or tumor giant cells. Polymorphonuclears in pearls and many lymphocytes in stroma.

Mitoses: normal, 50; abnormal, 5.

Second biopsy. One day after treatment. Necrosis and acute inflammation. Some vacuolization of tumor cells. Polymorphonuclears, lymphocytes and plasma cells in stroma.

Mitoses: normal, 0; abnormal, 0.

Third biopsy. Two days after treatment. Necrosis of tumor cells in places with an infiltration of polymorphonuclears. Some cells vacuolated and many with hyalin droplets in cytoplasm. Stroma edematous and infiltrated with polymorphonuclears and lymphocytes. Thrombosis of some blood vessels.

Mitoses: normal, 0; abnormal, 2.

Fourth biopsy. Three days after treatment. Tumor better differentiated and more scirrhous. Occasional vacuolated cell. Polymorphonuclears, lymphocytes and some eosinophiles in stroma.

Mitoses: normal, 0; abnormal, 7.

Fifth biopsy. Five days after treatment. Keratinization more marked. Still some vacuolated cells and some containing hyalin droplets.

Mitoses: normal, 0; abnormal, 13.

Sixth biopsy. Six days after treatment. Very few tumor cells. Most of specimen acute inflammatory tissue. Mitoses could not be counted as so few tumor cells.

Seventh biopsy. Seven days after treatment. Necrotic tissue.

Eighth biopsy. Eight days after treatment. Tumor cells well differentiated. Some vacuolated and some containing polymorphonuclears in cytoplasm. Stroma dense and infiltrated with lymphocytes, plasma cells and eosinophiles.

Mitoses: normal, 0; abnormal, 35.

Ninth biopsy. Nine days after treatment. Normal cervical tissue showing some acute inflammation. No tumor.

Case 5

First biopsy. Before treatment. Squamous cell carcinoma with practically no differentiation. No multiple mitoses or tumor giant cells. Foci of necrosis in centres of some strands of tumor cells. Many plasma cells and polymorphonuclears in stroma. A few vessels thrombosed.

Mitoses: normal, 12; abnormal, 0.

Second biopsy. One day after treatment. Necrosis and acute inflammation. Thrombosis of some blood vessels.

Mitoses: normal, 0; abnormal, 0.

Third biopsy. Two days after treatment. Tumor cells vacuolated. Necrosis and acute inflammation.

Mitoses: normal, 0; abnormal, 0.

Fourth biopsy. Three days after treatment. Acute inflammation. Increased amount of connective tissue.

Mitoses: normal, 0; abnormal, 0.

Fifth biopsy. Five days after treatment. Tumor more scirrhous than before. Tumor cells unchanged in appearance. Some necrosis. Plasma cells and lymphocytes in stroma.

Mitoses: normal, 0; abnormal, 0.

Sixth biopsy. Five days after treatment. Tumor cells larger and some with vacuoles. Some necrosis with invasion of polymorphonucleears. Polymorphonucleears, eosinophiles, plasma cells and lymphocytes in stroma.

Mitoses: normal, 0; abnormal, 0.

Seventh biopsy. Six days after treatment. Tumor cells unchanged. Increased amount of connective tissue. Fewer leucocytes in stroma.

Mitoses: normal, 2; abnormal, 1.

Eighth biopsy. Seven days after treatment. Small amount of tumor present. Necrosis and acute inflammation.

Mitoses: normal, 0; abnormal, 0.

Ninth biopsy. Eight days after treatment. No change.

Mitoses: normal, 0; abnormal, 0.

Tenth biopsy. Nine days after treatment. A few of the tumor cells vacuolated. Acute inflammation.

Mitoses: normal, 0; abnormal, 0.

DISCUSSION

From the above data and from a study of the chart of the mitotic figures, it will be noted that the cases fall roughly into two groups as regards their reactions on the third and fourth day following treatment. The first group cases 1, 2, and 3, showed a marked rise in the number of mitoses at this time whereas the cases in the second group,—numbers 3 and 4,—showed no such rise. It is this difference in reaction on the third or fourth day following radium that we wish to stress in this paper. As was stated above, cases 1, 2 and 3 were all dead at the end of thirteen months while cases 4 and 5 are still alive and free from symptoms, two years and four months since being treated. Therefore, while the series is small, it appears that this difference in reaction may possess some significance as an aid in prognosis and possibly as an indication for a different method of treatment. It is not intended to attempt at this time an explanation or interpretation of the difference in the reactions.

The various histologic changes affecting the tumor cells following radium which are described have been dealt with extensively by other investigators. There are a few points, however, that it may be of interest to emphasize. The first is the decrease in the number of mitoses twenty-four hours after radium. In cases 3, 4 and 5, this fall reached zero while in case 2 the number fell from fifty-four to thirty-two; in case 1, there was no twenty-four hour specimen. In the three cases that showed the marked rise in mitotic figures following this decrease, there was a second fall occurring on the fifth and sixth days. This diminution in number of mitoses was true of both the normal and abnormal mitotic figures.

In regard to the occurrence of abnormal mitotic figures, it is of interest to note that three cases had a number of these types of karyokinetic figures before radiation. Following radiation, the abnormal mitoses in two cases paralleled the normal type in their fall. In the rise following radiation, the ratio of normal to abnormal mitoses was reversed, the abnormal markedly predominating. This same change was true of the mitotic figures in the normal cervical epithelium in one case.

SUMMARY

1. Five cases of advanced carcinoma of the cervix were studied clinically and histologically following radium treatment.
2. Daily biopsies, the first taken before treatment was started, were done until no more tumor tissue could be obtained.
3. Histologically, the cases fall into two groups, the first group showing a marked rise in the number of mitoses on the third or fourth day following treatment while the second group shows no such rise.
4. The patients in the first group were all dead at the end of thirteen months while those in the second group are alive and well over two years and five months following treatment.
5. It is suggested that the difference in type of reaction following radium may possess some significance as regards prognosis and possibly indicates the need of further investigation with regard to a change in the method of treatment.

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3d biopsy

THE TEMPERATURE REACTION FOLLOWING SUBTOTAL THYROIDECTOMY*

BY J. LERMAN, M.D.†

THE introduction of Lugol's solution in the preoperative treatment of exophthalmic goitre has been followed by a considerable diminution in the severity of the reaction following operations on the thyroid. Numerous factors influence the severity of this reaction. The interest in one of these, namely, the effect of season, led to this study.

The ideal approach to this problem is through an elaborate analysis of every phase of the reaction in a large series of patients. The data at hand is insufficient for such an analysis, and even if it were available, the task would hardly be feasible. Segall and Means[1] have studied this reaction in part by an analysis of the basal metabolism, pulse and temperature in a series of cases. Clinically the temperature is one of the best guides to the response of the body to physiological or pathological stimuli. On the assumption that it is an index of the entire postoperative reaction, it has been made the basis for this study.

Method: The records of all patients with exophthalmic goitre having a subtotal thyroidectomy during the period of January 1926 to February 1930 inclusive were examined. Patients having partial operations on the thyroid were excluded purposely in order to make the data as uniform as possible. The records of patients who died or who developed postoperative complications were considered separately. This left a group of 170 cases for study. The data obtained consisted of the average basal metabolic rates before iodine had been started, and the maximum recorded temperature for the three days preceding operation, the day of operation, and ten days postoperatively. These figures were grouped first, according to the height of the basal metabolism, second, according to the preoperative temperature, and finally, according to the month of operation. The average metabolic rate and the average temperature of each day were calculated, as well as their probable errors. The average temperatures of the preoperative days and of the ninth and tenth postoperative days varied so little from month to month, as to make the calculation of their probable errors unnecessary. To determine the coefficients of correlation, the figures were rearranged in the form of frequency distributions, as illustrated in table 1.

TABLE 1

DISTRIBUTION OF TEMPERATURE OF THE FIRST AND SECOND POSTOPERATIVE DAYS ACCORDING TO INITIAL BASAL METABOLISM

	Temperature (Degrees)								
B. M. R.	99.5-99.9	100.0-100.4	100.5-100.9	101.0-101.4	101.5-101.9	102.0-102.4	102.5-102.9	103.0-103.4	Total
%									
20-29	1	3	3	2	1	1	1		12
30-39	3	3	10	12	6	9	2	1	46
40-49	2	7	12	12	9	4		1	47
50-59	1	4	5	8	4	3	3	1	29
60-69			4	2	9	3			18
70-79			3	3	3	1		1	11
80-89			1	1			1		3
90-99					3		1		4
Total	7	17	38	40	35	21	8	4	170

Mean of B. M. R. = 48.5%
Standard Deviation of B. M. R. = 15.7
Coefficient of Correlation = 0.190±0.049

Mean of Temperature = 101.3°
Standard Deviation of Temp. = 0.786

Results: It is well known that hyperthyroid patients frequently show a slight degree of fever. It seemed to be of interest to determine what relation, if any, existed between the severity of the disease, as judged from the initial metabolic rate, and the pre- and postoperative temperature levels. This can be done mathematically by determining the coefficient of correlation between the initial metabolic rate as one variable and the temperature reaction of any given period as the other variable of a frequency distribution. The significance of the correlation may then be judged from the probable error of the coefficient, since any coefficient which is less than six times its probable error is not significant.

By this method the coefficient of correlation between the initial metabolic rate and the average temperature of the three preoperative days was found to be 0.146 ± 0.050, which is obviously not significant. However, it must be

*From the Thyroid Clinic and Metabolism Laboratory of the Massachusetts General Hospital.

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pointed out that the great majority of the patients had obtained their maximum iodine response by this time. Consequently these facts do not necessarily apply to non-iodized patients. For the postoperative days the coefficients of correlation are also found to be non-significant. For example the coefficient of the first and second day is 0.190 ± 0.049 and for the third day is 0.171 ± 0.050.

The next point to be considered was the effect of the preoperative temperature level on the subsequent temperature reaction. On calculating the coefficients of correlation between the average temperature of the three preoperative days and the temperature range of the various postoperative days, it was found that there is no significant correlation. For example, the value of the coefficient for the second day, when the temperature was 101.3°, is 0.100 ± 0.051. For the other days the values are still smaller.

It would appear from the above results that the postoperative course, as judged from the temperature chart, is not materially affected by the existence of a slight degree of fever preoperatively (about 100 degrees or less). This information is of some importance in judging the time suitable for operation. Patients with hyperthyroidism often show a slight temperature elevation. Operation on such patients is usually delayed for fear of a severe postoperative reaction or complication. In general, this is a wise procedure. However, in those cases where infection can be ruled out, or if infection is present, it consists of the lingering, but mild subacute stages of an upper respiratory infection, operation need not necessarily be delayed. Such patients usually do just as well after operation as those with normal preoperative temperatures.

The final point to be considered was the effect, if any, the season of the year had on the postoperative course. The reaction was judged from the average monthly temperature for each postoperative day. The results indicate that for the first and second days after operation, the temperature rose to approximately the same level for all months, 101.2°—101.4°, and by the eighth day dropped to within normal limits. Between the third and seventh days, inclusive, there are some differences noted, the temperature persisting higher in some months than in others. In this respect the month of October was the mildest and the month of February the severest. Fig. 1 shows this difference graphically. In table 2 the average temperatures are arranged in

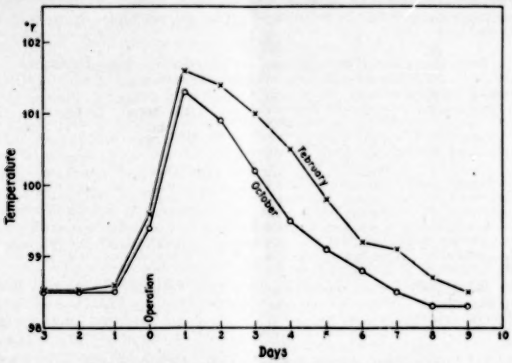

FIGURE 1. Comparison of the pre- and postoperative temperature reaction in exophthalmic goitre during the months of February (16 cases) and October (11 cases) at the Massachusetts General Hospital.

TABLE 2*

AVERAGE PRE- AND POSTOPERATIVE TEMPERATURES IN 170 PATIENTS WITH EXOPHTHALMIC GOITRE, IN GROUPS OF THREE MONTHS

		Sept. Oct. Nov.	Dec. Jan. Feb.	Feb. Mar. Apr.	Mar. Apr. May	June July Aug.
No. of Cases		44	49	40	43	34
Pre-Operative Days	3	98.51	98.49	98.50	98.50	98.80
	2	98.60	98.46	98.58	98.62	98.71
	1	98.66	98.57	98.59	98.64	98.64
Day of Operation		99.61	99.55	99.58	99.41	99.76
Post-Operative Days	1	101.23	101.43	101.41	101.27	101.19
	2	101.13	101.23	101.30	101.39	101.18
	3	100.43	100.59	100.90	100.77	100.60
	4	99.77	100.14	100.43	100.26	100.26
	5	99.36	99.69	99.93	99.92	99.76
	6	98.96	99.19	99.48	99.54	99.14
	7	98.80	98.86	99.11	99.07	98.84
	8	98.51	98.69	98.81	98.71	98.89
	9	98.47	98.43	98.64	98.64	98.56
	10	98.22	98.32	98.43	98.50	98.39

*The probable errors are omitted in order to simplify table. They will be furnished to anyone on request.

groups of three months, with the mildest group, September, October and November, as the starting point. From this table it is clear that the height of the postoperative fever is reached in the first two days, and is practically the same for all seasons. During the third to the sixth day inclusive it is sustained at a higher level in the months of February, March, April and May, than in the months of September, October and November. This may be verified mathematically from consideration of the temperature differences and their probable errors. Any difference which is three or more times its probable error may be considered significant. The figures in table 3 demonstrate that the differences for these months during the third to the sixth day inclusive are definitely significant. For the months December to February inclusive and June to August inclusive on the one hand and the months of September to November inclusive on the other, similar differences are found to exist for the fourth and fifth postoperative days only.

TABLE 3

DETERMINATION OF SIGNIFICANCE OF TEMPERATURE DIFFERENCES FOR SOME OF THE THREE-MONTH GROUPS

Day Post-op.	Temp. Differ. Feb.-Apr., and Sept.-Nov.	Prob. Error of Differ.	*Differ.* / P. E.	Temp. Differ. Mar.-May, and Sept.-Nov.	Prob. Error of Differ.	*Differ.* / P. E.
1	0.18	±0.128	1.4	0.04	±0.110	0.4
2	0.17	±0.134	1.3	0.26	±0.135	1.9
3	0.47	±0.134	3.5	0.34	±0.140	3.1
4	0.66	±0.125	5.3	0.49	±0.125	3.9
5	0.57	±0.101	5.6	0.56	±0.103	5.4
6	0.52	±0.115	4.5	0.58	±0.116	5.0
7	0.31	±0.123	2.5	0.27	±0.125	2.2
8	0.30	±0.105	2.9	0.20	±0.113	1.8

Complications following operation on the thyroid have become rare. Of all the patients with exophthalmic goitre operated on in this hospital since January 1926, in all over two hundred, only three developed pulmonary complications (consolidation or collapse), and only two developed a postoperative thyroid crisis or storm. Recently, however, careful examination of each patient postoperatively has revealed pulmonary involvement of a transient nature in numerous instances. This may account for at least part of the severe reactions. A complete analysis of these complications will be made by Dr. Donald S. King in the near future. There were three deaths during this period. One patient died probably of pulmonary embolism, auricular fibrillation having been present for a long time. Another[2], one of the two patients who had a thyroid crisis, died partly as a result of acute rheumatic endocarditis and pericarditis. The third patient died suddenly at the conclusion of operation. Roentgen ray examination, post mortem, showed an air embolus in the pulmonary artery.

CONCLUSIONS

The degree and duration of the temperature reaction following subtotal thyroidectomy for exophthalmic goitre does not bear any relationship to the severity of the disease as judged from the average initial metabolic rate.

This reaction is not influenced by the degree of fever present before operation. A slight elevation of temperature, even though it is associated with a mild, protracted upper respiratory infection, is no contra-indication to operation.

The maximum height of the postoperative temperature reaction does not vary with the season of the year, but the duration of the reaction is definitely longer in the late winter and early spring than in the late summer and early fall.

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PNEUMOCOCCUS MENINGITIS WITH RECOVERY

BY LEO J. LYNCH, M.D.*

PNEUMOCOCCUS meningitis, an uncommon disease, has been considered by some as invariably fatal, while others have held that patients have survived it in a small percentage of instances. Very few recoveries have been reported; the first of these was cited by Jemma in 1896. There are many cases found in the literature of today, most of which were fatal, but among them have been a few recoveries. It is apparent, however, that the disease is on the increase, and, because of this increase and the high mortality of the disease, we are prompted to report a case which we treated with Felton's serum with complete recovery.

Croft[1], in his article in the *Lancet*, 1928, quotes recoveries reported by Globus and Kasanin, Harkavy, Gould, Simpson, and Cautley. His own patient recovered, after treatment with Allen and Hauburg's serum intramuscularly.

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Kennedy[2] reports five cases in the Montreal General Hospital, all of which terminated fatally. He quotes Kolmer, Schottmuller, and Cole as also finding one hundred per cent. mortality. In his paper recoveries reported by Cumming, Campbell, Ratnoff and Litvak, Simpson, Synge, Douthewaite, Harkavy, and Globus and Kasanin are mentioned.

According to Harkavy[3], Jackman found one hundred per cent. mortality, while Lubarsch considers there is one per cent. recovery, and E. Frankel two per cent. Harkavy quotes Devic, Halle, and Cruviellier as having individual patients who got well.

In Harkavy's case with a favorable outcome the patient was treated with Felton's serum by the lumbar and cisternal routes. This was a Type I case and the spinal fluid was sterile after the first injection.

Harkavy quotes Ratnof and Litvak, who treated a Type III case with serum but had no success until ethyl cupriene hydrochloride (optochin) was added. Bohneke believes this increases the action of the serum, and Stewart verifies this statement by his experiments on dogs. Kolmer and Idozumi state that optochin is most effective when given intraspinally early in the disease.

Globus and Kasanin[4] report a favorable result in a case which was treated by lumbar and cisternal drainage without the use of serum.

Bauer and St. Clair[5] studied a series of cases to determine the most prevalent types. Their conclusion was that Type III predominates in cases following otitis media, and Type IV in cases without a history of otitis.

CASE REPORT

Our patient was a male, aged 16, admitted to the Malden Hospital on February 18, 1929, complaining of pain and discharge from the right ear. The history stated that he had been ill for ten days with grippe. On February 10, while at home, a diagnosis of lobar pneumonia was made. He was said to have had a crisis on February 14, following which his temperature was normal and he was apparently recovering. However, on the evening of February 15, he had chills and some rigidity of the neck, pain in the right mastoid region and a discharge from the right ear. February 16 and 17 the symptoms were more marked, and on February 18 he was referred to the Hospital.

The boy had always been well. The family history was negative. His father, mother and six brothers were living and well.

Physical examination showed a well-developed, semi-conscious boy, complaining bitterly of headache. The size of the pupils was not recorded, but they reacted to light and accommodation. Both ears were discharging. The throat was injected and there was some exudate on the tonsils. The neck was rigid, and tenderness and induration were noted just below each mastoid region. The heart was rapid but regular; there were no murmurs present. The lungs showed both lower lobes dull to percussion and bronchial breathing was present. Moist râles were heard over the entire chest; the abdomen was negative; the extremities showed no abnormalities. The knee-jerks were slightly hyperactive and equal. Kernig sign was present bilaterally; neither clonus nor Babinski sign was present.

On admission the temperature was 100.5°, pulse 100, respirations 24; hemoglobin 80%, red cells 4,480,000, white cells 24,000, polymorphonuclear leucocytes 85%, lymphocytes 15%. The spinal fluid obtained under pressure was turbid and showed a cell count of 470, which were practically all polymorphonuclears. A smear of the fluid was made and showed encapsulated Gram-positive, lance-shaped diplococci. An attempt was made to culture the fluid and type the germ without success.

Before the serum was given the boy's temperature had risen to 105.8, pulse 98, and respirations 29. The serum was then given intraspinally and intravenously about three times daily, and the temperature fluctuated from 100° to 103.8° from February 19 to February 22. At this point the serum was discontinued but the lumbar punctures were performed daily for drainage.

The temperature then ranged daily from 99° to about 103.8° until February 28, after which it became level at about 99°. A short time later the right elbow became inflamed and went on to suppuration. This was incised on March 2 and thick pus was obtained, a smear of which showed an organism identical with that in the spinal fluid.

Following the incision in the elbow, there was a distinct improvement in the general condition, with an occasional exacerbation of high fever, during which there appeared, at different times, redness and tenderness of the right hip, tenderness over the left kidney, and stiffness in the left knee. There was a slow, gradual improvement until the patient was discharged on April 6, 1929.

At the present time he is reported by his family to be in the best of health, enjoying all types of athletic games with no hindrances.

This patient was the picture of death, was on the danger list for many days, and all hope for his recovery was given up, even by those in charge of his case. We feel that the recovery was due to the early diagnosis and prompt use of Felton's serum, followed by spinal drainage daily over a long period.

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PUBLIC HEALTH ADMINISTRATION IN MAINE

BY JAMES A. TOBEY, DR.P.H.*

MAINE, like Massachusetts and Connecticut, is one of the states which early adopted the system of state health administration consisting of a commissioner and an advisory public health council. Prior to this step in 1917, the state had had a health organization for many years. At first its functions were largely educational and advisory, but of late years this state department has been invested with extensive control over local health administration. Maine is now one of several states having a system of district health officers.

HISTORY AND DEVELOPMENT

Maine was originally a part of Massachusetts and did not become a separate state until 1820. As in the case of most of the other New England states, local health administration in Maine was established many years before this work was organized on state-wide lines. Portland had a board of health as early as 1833, though its duties were probably mostly of a quarantine nature. In 1853, or possibly earlier, a state law was passed providing for local health boards generally.

The first state board of health was organized in 1885. It consisted of seven members, each appointed for seven years. Shortly thereafter the number of members was reduced to six appointed by the governor for six-year terms, and the board was authorized to elect a secretary, who by virtue of his office became one of its members. The work of this board was almost entirely advisory, its only administrative powers being the establishment of "inspection service" in time of dangerous epidemics. According to the Revised Statutes of 1903 the maximum allowable yearly appropriation to the board was only $5500.

Vital statistics were efficiently registered in Maine from early times, a comprehensive law having been passed in 1892, so that the state was one of the original members of the federal death registration area, established in 1915. Maine received 280 points out of 1000 in Dr. Charles V. Chapin's rating of state health work in 1914, the state ranking twenty-second. Dr. Chapin particularly recommended improvement in local health administration[1].

With the exception of minor changes in the laws in 1913 and 1915, slightly increasing the scope of the powers of the board of health, the system of 1885 remained in effect until 1917. In that year the legislature abolished the state board of health and created in its stead a department of health, consisting of a commissioner, a public health council, and directors of divisions. In making this move Maine, and Connecticut which took similar action the same year, followed the lead of New York and Massachusetts, which had established this form of organization in 1901 and 1914 respectively.

This law of 1917 (Chapter 197) provided that the commissioner should be a physician skilled in sanitary science appointed by the governor for a term of six years. The public health council consisted of the commissioner as chairman and four members, two of whom must be physicians, appointed for terms of four years. The salary of the commissioner was fixed in the law at $4000 a year, though in 1921 this provision was changed so that the governor and his council could upon the recommendation of the public health council, increase the commissioner's compensation to a sum not to exceed $5000.

The work of the new department was first organized in July, 1917 under six divisions:—administration, communicable diseases, diagnostic laboratories, sanitary engineering, education and publicity, and vital statistics. A venereal disease division was added in 1918, as was also a division of hotel inspection, and in 1920 there was created a new division of public health nursing and child hygiene[2].

Three health districts were created in the state by the department in 1917 and a full-time trained health officer placed in charge of each. More extensive jurisdiction over local health administration was given to the department by the legislature in 1919 (Chapter 172). This law made mandatory the employment of a health officer by every city, town, and organized "plantation" in the state, such appointments to be approved by the state department of health. If the officer was a full-time employe, the state was authorized to contribute one-third of his salary, though the sum was not to exceed $800 a year. All local health work was placed under the general supervision of the state department. The number of health districts was increased from three to eight in 1920. In 1929 there were eight full-time health officers in cities having populations of 10,000 or more[3].

An act of 1923 (Chapter 221) enlarged the public health council by the addition of a dentist to its membership.

PRESENT ORGANIZATION

The state department of health, as now constituted by law, consists of the commissioner of health; a public health council of six members, with the commissioner as chairman, and eight divisions.

The commissioner of health is appointed by the governor, with the consent of his council, for a term of six years. He is required to be a physician skilled in sanitary science and experi-

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enced in public health administration, and he must devote full time to his duties. His salary is set by law at $4000 a year, with the proviso that this amount may be increased by the governor and council, upon recommendation by the appointive members of the council, to not more than $5000. The commissioner is administrative head of the department, his duties being to administer the health laws, prepare rules and regulations for consideration by the public health council, and with the advice of the council to appoint and remove directors of divisions and district health officers. The commissioner may be removed by the governor, with the advice and consent of the council, for cause shown at a hearing. Since the enactment of the law in 1917 there have been two commissioners, the present incumbent having been appointed in 1921.

The public health council consists of the commissioner as chairman and five other members appointed for five-year terms by the governor, with the consent of his council. The terms are so arranged that one expires each year. Of these members, two must be physicians and one must be a dentist. Of the two lay members in 1929, both were women. The council must meet at least once a month and at other times when called by the commissioner or in accordance with its own rules or on request of three members. The council has no administrative or executive functions, its duties being advisory.

The number of divisions in the department is left to the commissioner to determine, with the approval of the council. In 1930 there were the following divisions, each in charge of a full-time director:—

Administrative
Communicable diseases
Laboratories
Sanitary engineering
Vital statistics
Social hygiene
Public health nursing and child welfare
Dental hygiene

The division of dental hygiene is somewhat unique in a state health department, though dental hygiene activities are often undertaken by such departments. Maine is one of five states which consistently refused to accept the Federal Maternity and Infancy Act until the last two years (1927-1929) of the Act.

The commissioner is empowered, with the approval of the council, to divide the state into three or more health districts and appoint and remove district health officers for each. Such health officers must devote full time to their duties and they must either be graduates of an incorporated medical school and admitted to practice in the state, or else shall have been certified in public health by a reputable institution of collegiate grade. In 1930 there were seven such district health officers, all physicians.

For the fiscal year ending June 30, 1930 there was appropriated to the department the sum of $145,500.

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TESTS OF DAIRY CATTLE TO ELIMINATE SOURCE OF TUBERCULAR MILK, WHICH COSTS 8,000 LIVES ANNUALLY, URGED AS PUBLIC POLICY OF STATES

By Dr. J. H. McNeil

Chief, Bureau of Animal Industry, State of New Jersey

The most prevalent of animal diseases which may be transmitted to the human family, especially to children, is bovine tuberculosis. For this reason State and Federal agencies are maintaining a large staff engaged in the eradication of this disease from dairy herds.

Of the one hundred thousand people who die of tuberculosis in the United States each year, eight thousand are men, women and children who have become infected with the bovine type.

Probably most of this infection has been contracted under the age of fifteen years by consuming infected milk, milk products or other food products which may have become accidentally contaminated through handling. Between twenty-five and thirty per cent. of all tuberculosis in children under five years of age is contracted from milk or other bovine source.

Aside from the priceless consideration of human life, the eradication of bovine tuberculosis is important to the dairyman from an economic standpoint, because the disease decreases the productivity of dairy animals and is the cause of enormous losses to the livestock industry. To meet this economic loss it is necessary for the dairyman to take steps to eliminate diseased animals from his herd.

The owner who desires to have a clean herd will be rewarded for his efforts. Years of actual work in tuberculin testing have proven that tuberculosis can be eradicated from dairy herds.

It has been demonstrated that all the cattle supplying milk to a given city, a township, county or State may be freed from the disease and maintained in good health. However, substantial and permanent progress cannot be made along these lines unless the herd owner gives full coöperation working toward this end.—*U. S. Daily.*

NEW HAMPSHIRE MEDICAL SOCIETY

GENERAL MEETING

Masonic Temple, Concord, Tuesday, May 13, 1930, 10:30 A.M.

PRESIDENT HENRY O. SMITH: The Society will please come to order and listen to an invocation by the Rev. A. O. Phinney, Concord.

INVOCATION

REV. MR. PHINNEY: Almighty God, our Heavenly Father, who art the source of all life and health, Inspirer of all those who diligently search after truth, we ask that Thy presence may be with this convention. May Thy Holy Spirit guide and illumine their minds in all their discussions and deliberations, and inspire in them a burning zeal to learn the truths of life, that they may help and alleviate the suffering and the burdens of Thy children. And grant, O God, that all success which they may attain they may attribute to Thy power and to Thy glory, through Jesus Christ, our Lord. Amen.

THE PRESIDENT: We will now listen to the report of the Committee on Arrangements by Dr. Robert O. Blood, Chairman.

REPORT OF COMMITTEE ON ARRANGEMENTS

DR. BLOOD:

It becomes my pleasant duty as Chairman of the Committee on Arrangements to again welcome to Concord the New Hampshire Medical Society and its Auxiliary. Concord has been favored in the past with the privilege of entertaining this honorable body. Annually its members returned to Concord, for many years preceding 1924, when we met in Manchester. Since that date the annual meeting has been held four times in Manchester and in 1927 in the city of Portsmouth. It has been our endeavor in arranging this meeting to entertain the Society to the best of our ability and hope that it will commend Concord to your favorable consideration as host for many years to come.

It is not my intention or desire to take up your time reading the program. However, there are several things in connection with it which I desire to call to your special attention and consideration.

First: The program for the general meetings arranged by your efficient Secretary and printed in the general program which you have already received, or may secure at the desk, is entirely self-explanatory and all of the papers deserve the consideration and attendance of every member of the Society.

Second: This evening we have arranged a special semi-social function which is to be held at Saint Paul's School, beginning at 7:30 P. M. (standard time). I expect you have already received a mimeographed program of the evening's entertainment but for fear you may not all have received these programs I am taking the liberty to read a brief announcement of this event:

> Dr. Drury, rector of St. Paul's School, will welcome you, to be followed by Motion Pictures, secured from the Harvard Film Foundation. Subjects: 1. The Nation's Market Place. 2. Romance of Rayon. Mr. Muzzey, "The Will Rogers of New England" will entertain you. Refreshments will follow the entertainment. A bus will be at the disposal of the Society to take out-of-town members to the entertainment, leaving the Eagle Hotel at 7:10 P. M.

Third: The Superintendent of the Margaret Pillsbury General Hospital wished me to extend a welcome to the members of the State Medical Society and their wives to visit the institution at any time, and on tomorrow afternoon cards will be played in the nurses' residence from 2:30 to 4:30 P. M. In the administration building guests will be received and tea served from 4:00 to 5:30 P. M.

Fourth: The banquet committee is especially anxious to know how many will attend the banquet tomorrow evening at the Eagle Hotel at 7:00 P. M. If you have not already secured your tickets we wish you would do so at the earliest opportunity. The special speakers for this occasion will be the President of the American Medical Association, Dr. M. L. Harris and the Honorable Roland S. Copeland, United States Senator of New York. Either of these speakers would make a program that no one can afford to miss.

> I wish to emphasize that the entire program for these meetings will be held on Eastern Standard Time.

In conclusion I wish on behalf of the local members of the society to welcome you to our city and hope that you will feel free to call upon us at any time during your stay in Concord.

ROBERT O. BLOOD, *Chairman*,
General Committee on Arrangements.

PRESIDENT SMITH: I have two announcements which I wish to make at this time. I hold in my hand a leaflet, entitled "A Message to the Women of New Hampshire", which has been printed by the Committee on Control of Cancer of our Society. Dr. Clow has placed a large number here and he wishes you would take as many of them as you can use.

The second announcement is this. There will be a meeting of the Councilors in this room immediately at the close of the forenoon session.

PRESIDENT SMITH: If there are present any visiting delegates from other states, will they come forward and Dr. Charles H. Dolloff, Chairman of the Committee on Guests and Visiting Delegates, will be glad to introduce them to us.

DR. DOLLOFF: It affords me much pleasure to find that Massachusetts has sent two excellent delegates to represent that state at this convention, and I am pleased to introduce Dr. John H. Lambert, a prominent surgeon of Lowell, and Dr. John M. Birnie, also a prominent surgeon, of Springfield, and a former president of the Massachusetts Medical Society. (Dr. Lambert and Dr. Birnie stand.)

From Connecticut we have with us Dr. R. L. Leak, an institutional man, I am sorry to say, but nevertheless an important one in the circles in which I travel. Dr. Leak has distinguished himself as the superintendent of the Middletown State Hospital in Connecticut, and he is now busily engaged in building an entirely new State Hospital for Connecticut. (Dr. Leak stands.)

PRESIDENT SMITH: I am sure we would appreciate something more than this. We wish for a few words from each of these visiting delegates. I will call first on Dr. Lambert.

DR. LAMBERT: It is a very happy privilege that I have of being a delegate to your annual meeting this year. I wish to bring the greetings of the State Society of Massachusetts to your Society today, to express the very friendly feeling which its members have for you, and to hope and assure you that friendly feeling will exist in time to come, and I am sure that the bonds of union and friendship which have been established through the delegates from the various Councils of the New England States cannot help but make stronger and more unified the position of the medical profession in New England.

PRESIDENT SMITH: Dr. Birnie of Massachusetts.

DR. BIRNIE: I have not any message to bring you. I am here to learn. I am here to see how you run your Society and the type of program you have, and so forth, and to take back a report to our Society. From the printed program which I have in my pocket I am very sure that the report which I shall make will be well worth while for our Society.

One thing I might say to you, ladies and gentlemen, is that in June, 1931, the Massachusetts Medical Society will celebrate its One Hundred and Fiftieth Anniversary. It is the oldest Medical Society in continuous existence in the United States. I was present at a committee meeting yesterday outlining the program for 1931 and I can assure you gentlemen that it will be well worth your while to make a visit to Boston, and we cordially extend to all of you a most hearty welcome and invitation to be present on that occasion.

PRESIDENT SMITH: Dr. Leak, of Connecticut.

DR. LEAK: After the introduction by Dr. Dolloff, I hardly know what to say when he said he was sorry that I was another institutional man. I do not quite agree with that word "sorry". In Connecticut we find that our institutions are quite an important factor in our community. I do not know just what the situation is in New Hampshire, but we find it quite necessary to start building a complete new building in our small state and that job has been placed upon my shoulders. But, at any rate, I do bring to you from the State Medical Society of Connecticut our sincere and best wishes. I want you to know that our state is in hearty accord with anything that you are endeavoring to do and wishes to back you up. Our State Society meets in Hartford on May 21 and 22, and at this time clinics will be given, and as Vice-President of our State Society I issue to you a cordial invitation to be present at any and all of our sessions. I thank you very much.

PRESIDENT SMITH: We are very glad indeed to welcome the visiting delegates and we hope that they will stay with us through the two days' sessions, listen to the papers, and feel free to take part in the discussions.

A paper entitled "Arterio-Sclerosis of the Coronary Arteries with Report of Autopsy", was read by Dr. Osmon H. Hubbard, Keene.

The discussion was opened by Dr. W. F. Taylor, Keene, and continued by Drs. Louis C. Ager, Waterloo, G. E. Hoffses, Manchester, John C. Huckins, Plymouth and Dr. Hubbard.

The following papers and discussions were given:

Fracture Treatment: Convalescence and Apparatus, Dr. Frederic J. Cotton, Boston. Discussion: Drs. Carleton R. Metcalf, Concord; Ezra A. Jones, Manchester and Cotton, Boston.

Medical Testimony, Alvin A. Lucier, Esq., Nashua. Discussion: William N. Rogers, Esq., Concord, and Dr. Louis W. Flanders, Dover.

AFTERNOON SESSION, TUESDAY, MAY 13

The afternoon session began at 2.45 p. m., the Vice-President, Dr. Osmon H. Hubbard, Keene, presiding.

VICE-PRESIDENT HUBBARD: The first paper on our program this afternoon is the President's address. I know you will all be pleased to listen to one who has taken such an active interest in the Society and been so constructive in all its proceedings, and it gives me great pleasure to introduce Dr. H. O. Smith, the President of our New Hampshire Medical Society.

Dr. Smith delivered an admirable address dealing largely with recommendations of former presidents and making a convincing plea for medical supervision of all health work.

The following papers and discussions were given and the session closed with the presentation of a scientific motion picture.

Methods and Results of Diabetic Treatment, Dr. Frederick M. Allen, The Physiatric Institute, Morristown, N. J. Discussion: Drs. H. T. French, Hanover and C. O. Coburn, Manchester.

Pyuria in Children, Dr. Richard W. Robinson, Laconia. Discussion: Drs. Frank N. Rogers, Manchester; Elmer J. Brown, Manchester, and Dr. Robinson.

A Case of Undulant Fever, Dr. H. C. Pickwick, Lisbon. Discussion: Drs. A. T. Downing, Littleton; H. A. Des Brisay, Hanover; H. J. Connor, Concord; and C. O. Coburn, Manchester.

Motion Picture—"Movements of the Alimentary Tract in Experimental Animals." A comprehensive study of peristalsis from the stomach to the rectum in the dog, cat and rabbit. (25 minutes.)

SECOND GENERAL MEETING

The morning session of the Second General Meeting was called to order by President Smith, in Masonic Temple, Concord, Wednesday, May 14, 1930, at 10.35 a. m.

The first paper "Some Phases of Dentistry Which Should Concern the Medical Practitioner", was read by Dr. Otis M. Littlefield. Discussion: Drs. William E. Reed, Nashua; D. C. Norton, Manchester; F. N. Rogers, Manchester; P. H. Greeley, Portsmouth; Thomas W. Lucas, Portsmouth, and Dr. Littlefield.

PRESIDENT SMITH: Gentlemen, let me introduce to you Dr. Bartlett delegate from Connecticut.

DR. BARTLETT: I will take only one moment of your time to express my appreciation of the opportunity of being with you here today as one of the delegates from Connecticut, and to bring to you the greetings of the Connecticut State Medical Society. I had hoped to be present both of the days but was not able to be here yesterday. I will take the opportunity to remind you that our own meeting in Connecticut is to be held in Hartford next Wednesday and Thursday, and I trust we may have an opportunity to welcome delegates from your Society to our Society next week.

I thank you.

PRESIDENT SMITH: Gentlemen, I wish to present to you Dr. James S. Hill, of Bellows Falls, Vermont.

DR. HILL: Gentlemen, I did not expect to be called on because we have a delegate from Vermont who has not yet arrived. I just merely came with a brother practitioner to visit your meeting. We have taken a day off.

The only thing that I can say is that the subject is important. I did not hear the paper read by the dentist who has spoken here but I will be glad to tell you a little incident.

In Plymouth, Vermont, President Coolidge's old home town, there is a man who, as we say "is not all there", and he publishes a little book of what he calls his poems. He sits in the middle of the road in the summer time. You will see him most any time you go around there, and this came to my mind on hearing the discussion and seeing the program here. A dentist who has his office in the block where my office is went over there, and this poet called him as he always does everybody, and he said to the dentist:

"You are a doctor?"

The dentist replied, "Yes, but I am not a medical doctor."

"You are not? Why," he said, "I can tell a doctor just as far as I can see him. I know you are a doctor."

"Well, I am not a medical doctor, I tell you."

"What do you do?"

"Why," the dentist said, "I look in the mouth."

"I knew I was right. You are a horse doctor." [Laughter.]

I will say that I am very much pleased to be here to meet the doctors from a neighboring State. When he introduced me your President said I was from Vermont. It is a pleasure to come and meet friends, the great many I know here, and we are always very glad to have you come over to Vermont and meet with us. As I say, we have a delegate, and I was not expecting to be called upon, so I will thank you for this privilege.

The next paper, "The Present and Future Status of the General Practitioner", was read by Dr. Arthur W. Burnham, Lebanon.

Discussion: Drs. Emery M. Fitch, Claremont; Clarence E. Dunbar, Manchester, and Edward H. Egbert, Wolfeboro.

PRESIDENT SMITH: Gentlemen, I wish to present the President of the American Medical Association—Dr. Malcolm L. Harris, of Chicago. [Applause, all rising.]

"Otitis Media in Children" was read by Raymond H. Marcotte, Nashua. Discussion: Dr. A. L. MacMillan, Concord.

WEDNESDAY, MAY 14, 2 P. M.

PRESENTATION OF GOLD MEDALS

PRESIDENT SMITH: The Society will be in order. I wish to introduce, Dr. J. H. Blodgett, delegate from Vermont.

DR. BLODGETT: *Mr. President*, I have the personal pleasure and am delegated with the honor of bringing the greetings of the Vermont State Medical Society and its members to the New Hampshire State Medical Society and its members, and I beg to assure you gentlemen of the high esteem as to the ability and integrity in which we in Vermont hold our colleagues across the Connecticut.

PRESIDENT SMITH: *Members of the Society*, this is a very proud day for me because I am presiding at a session of this State Society which is unique, one without parallel in our history of 140 years. We have with us here today three men who have been members of the Society for 50 years, three men who have practiced medicine for 50 years or more in the towns in which they are still active.

The first is Dr. George Hoyt Sanborn, who has been a practitioner for 56 years, the last 54 in the town of Henniker. Our Secretary will present to him the Medal of Honor of this Society.

DR. SANBORN: *Mr. President, fellows of the New Hampshire Medical Society, visitors and others*—Language fails me to express to you my gratitude and heartfelt appreciation for being able to be present with you upon this occasion. This memorial presented to me as a testimonial of my affiliation with this Society for 50 years I will always prize, and when I pass on, as all my old associates of 40 years ago have gone before me, to join the great majority in that world from whose bourne no traveler returns, I shall endeavor to present this to my children and my children's children, that it may be handed down from the time I pass away and continue as a remembrance.

I should like to say a few words about my years of practice but the time is limited. I have been a country practitioner, a general practitioner, and by that I mean one that takes in everything that comes up. Hospitals—we did not use them in those days to any extent. We relied upon our own endeavors, and I want to say to the people here, while I am not egotistical, I have cured every sickness but the last. (Applause.)

PRESIDENT SMITH: I desire to present to you, Dr. Melvin T. Stone, of Troy, who will receive our Gold Medal.

DR. STONE: *Mr. President and members,* I appreciate this token of membership in the Society very much. My story is not a very long one. I have practiced 50 years in our small country town, and my experience has been that of the usual country practitioner, the general practitioner. I will say that I graduated in 1880—really, in November, 1879, and I started practice in the town of Troy in 1880. Two weeks before I went to Troy I did not know that such a town was in the State of New Hampshire. I appeared in that town on the night express on the 20th day of February and appeared out in the morning. The next morning there was a young doctor in the town. I did not know whether I would stay one week, one month or one year but I have been there a little over 50 years. As I say, my experience has been that of every country practitioner. As to my work and labors in that town during the years, someone else must tell the story. (Applause.)

PRESIDENT SMITH: We have one more man with this unusual record. The people in the town of Wilton last December gave him a memorable reception. At that reception there were thrown on the screen a series of tremendously interesting pictures. There were pictures of "Doc" in his old automobile with a deer strapped on the side, of "Doc" in overalls and rubber boots, looking with admiration at his nice strings of fish.

On the 15th day of April we had a meeting of the combined Medical Societies of Merrimack County and Hillsboro County. This man from Wilton was among the first to arrive. I congratulated him and said, "Doctor, you are putting the younger men to shame. You are here on time and the younger men are straggling in late as usual." He said, "On time? I got up at 5 o'clock this morning and I went out and caught 15 trout before breakfast."

I wish to present to you Dr. George Winsor Hatch, fisherman, of Wilton.

[A Medal of Honor was pinned on the breast of Dr. Hatch, by Secretary Sullivan.]

DR. HATCH: *Mr. President and Members of the Society,* I thank you very much for the honor. I never made a speech in my life, and I am not going to make one. I graduated with Dr. Stone on November 11, 1879, from Dartmouth Medical College. We were in the class of 1880. On the 24th of December I went into practice in Wilton about two miles from where I was born. Not having much to do on the 25th, I went away for my holiday. I waited there two weeks before anybody came to me who seemed interested in me and then they began to come. I had two patients in one day and no more for three weeks! I thought that was pretty good. I was married a little later. Finally, I worked into practice by March, plenty of work. During the first 15 years I drove four horses and always took care of my team myself—fed and watered my horses and cleaned them on the road but they got there just the same. For the last 20 years I have driven automobiles and kept on with my business, and I am going now all the time. Thank you. (Applause.)

CONGRATULATIONS OF THE STATE

PRESIDENT SMITH: We have with us a man who was desirous of being present that he also might do honor to these men. I have great pleasure in introducing to you His Excellency, Governor Charles W. Tobey, of New Hampshire.

GOVERNOR TOBEY: *Mr. President and fellow citizens,* the duties of the office of Governor are many and varied. Organizations without number call for the presence of the Governor to give the address of welcome and pay tribute to respective meetings, but I speak the truth to you ladies and gentlemen, this afternoon, when I say from my heart that in my office as Governor for the last 16 months there has been no occasion when I have taken greater satisfaction or experienced more real delight or deemed it more of a privilege than that of coming here this afternoon and speaking to you for a few moments and bringing to these three gentlemen before me on my right the tribute of affection and regard and esteem of the old Granite State.

Who can estimate the influence for good that has gone from the lives of these three men in their 50 years of continuous practice as doctors in New Hampshire? They have brought generations into the world, they have seen generations

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grow up and pass on to meet their reward, and still they live among us, hale and hearty. What changes these men have seen in transportation, in living conditions, and the progress which has been made in your noble profession! We hear a great deal about big business in our day, consolidations, men in high position in business life, and one of the attributes of big business all too often is this. The exponents thereof, when a proposition is put up to them, say, "What is there in it for us?" My friends, we know that so-called big business is in the world at large, but you, these three exponents by my side whom we honor today, you are engaged in the biggest business on God's green earth, that of rendering help and comfort and healing to your fellow men.

Ian Maclaren wrote a book called "Beside the Bonnie Brier Bush", and in that wonderful book he tells as only he can of the wonderful life of service of old Dr. MacLure of Drumtochty. Many of you will recall those pages telling the story of the good old Scotch doctor of Drumtochty who drove over those highlands and over those moors, year after year, through fog, rain, and storm, giving, according to the knowledge of that day, his service to his fellow man, healing the sicknesses and the diseases of that day and then he tells of the last hours of the doctor. My friends, the heroism of that old practitioner of Drumtochty, Scotland, we in New Hampshire have exemplified to us in the lives of these three men whom we delight to honor today after these 50 years of wonderful service to their fellow men, and I esteem it a great honor to bring to them the tribute of the old Granite State.

It is a great thing to have rendered service for such a length of time, and these men find their greatest reward unquestionably in the satisfaction which comes, not only from 50 years of faithful service, but from the influence of their lives on the happiness and welfare of their fellow men. Words are vain things, my friends, but they ought to express the best that is in us. I feel entirely futile this afternoon to adequately set forth what we in New Hampshire feel at this period of celebration in this afternoon's gathering; but, in expressing my regard for you as an Association possessing a record of honorable service which the New Hampshire Medical Society has enjoyed for many scores of years in the past, I close my tribute with these words taken from Sir Walter Scott, written years ago, when he said to old friends before he passed on:

"O friends, may the service of our days in various woods and ways
Prove to those that follow in our train, not valueless nor vain."

As Governor of New Hampshire I greet you today, and I but speak what is in the hearts of the people of New Hampshire when I bring to you a message of affection and high regard, hoping that God in His infinite power will spare your lives for many more years of service and fellowship amongst us.

CONGRATULATIONS OF DARTMOUTH MEDICAL COLLEGE

PRESIDENT SMITH: A message will be brought to these men from the Dartmouth Medical School by the Professor of Anatomy in that school, our own Fred Lord.

DR. FREDERIC P. LORD, Hanover: The speaker, who on this occasion, is representing Dartmouth College, was unable to utter an intelligible syllable at the time Dr. Hatch and Dr. Stone were beginning their medical training at Dartmouth Medical School. Very possibly when seniors as these men came down the hill from the Old Medical Building, pockets stuffed with apples from my father's back yard, too close by, alas! they stumbled over a tow-headed embryo anatomist sitting in the dirt of that road, which dirt he was accustomed to wipe off his hands into his hair. As I must have looked up to those men then, I still do today and am happy to pay them my respectful homage and that of Dartmouth College.

Out of 58 men entering the class of 1880 at Dartmouth Medical School, 26 received their doctor's degree. In 1930 only 3 of those 26, who practised medicine, are still living; one is retired in Florida, and 2, after practising 50 years (and a little more) in their native state and that of their college, are here in Concord this afternoon, members for 50 years of this Society which is happy to do them honor.

With Dr. George H. Sanborn, of Henniker, graduated from Bowdoin, six years before the other 2, these (three) men are living in the southern part of this State which seems a most healthful location for doctors, by the way—and are still practising their profession, to the great satisfaction of their fellow townsmen, most of whom, I suppose, they helped introduce into this Granite world, thus getting a first lien on their patronage as patients.

Such men as these, faithful these many years to their communities, always ready to meet their obligation as a privilege, loved by their many patients, are the type of doctors which Dartmouth has ever hoped and tried to send out from her doors. Located in northern New England, where no large metropolitan centers exist, it is the purpose and function of Dartmouth College to gather to its medical school, train, and turn out, physicians who are essentially human in their interests, practical and resourceful in their profession, and both able and happy to care for the sick in larger towns or in smaller towns under the varied and often restricted conditions which are found in this part of the world.

For over 130 years Dartmouth has been meeting this need, and the list of her graduates who have understood this need and have met its

requirements, is a large one. Among them Dartmouth is proud of its 2 graduates, "golden physicians" one might say, here today, and by them she is signally honored.

Dr. John F. Gile, Hanover, gave a paper entitled "Pathological Changes of the Endometrium". Discussion: Drs. H. N. Kingsford, Hanover, and George C. Wilkins, Manchester.

ADDRESS OF THE PRESIDENT OF AMERICAN MEDICAL ASSOCIATION

PRESIDENT SMITH: There is at hand the second notable event of the afternoon. There will be given an address on medical economics of the present day by the President of the American Medical Association. I am highly honored to have the privilege of presenting to you Dr. Malcolm LaSalle Harris, of Chicago.

At the close of the address, Dr. Smith expressed the appreciation of the society for the presence and interesting address of Dr. Harris and tendered to him its sincere thanks.

PHYSICIANS WHO HAVE PRACTICED FIFTY YEARS

PRESIDENT SMITH: There are five men in this State who have practiced medicine for 50 years who have not been introduced to the Society, I will call their names, and if they are present will they please come forward:

Dr. Frank B. Perkins, of Derry, who has already received in absence our medal as having been a member of the Society for 50 years.

Dr. George E. Leete of Concord.

Dr. Edward O. Otis of Exeter.

Dr. Charles F. Ober, of Manchester.

Dr. Herbert S. Hutchinson of Milford.

Demonstrating with thirty-six brains, presenting a large variety of conditions, there was given a Symposium, Intracranial Pathology Lesions, Diagnosis and Treatment by Drs. Timothy Leary, Boston; Abraham Myerson, Boston; John S. Hodgson, Boston. Discussion: Drs. Charles Duncan, Concord; Colin C. Stewart, Hanover; John F. Holmes, Manchester, and Edward H. Egbert, Wolfeboro.

On motion, duly made and seconded, it was voted to dispense with the reading of the report of the House of Delegates and the report of the Trustees.

PRESIDENT SMITH: My year of service as your president draws to a close. It has been an enjoyable one. With one exception, I have visited each county society in the state. Your cordial greetings and generous hospitality I can never forget. For the honor conferred upon me and the many kindnesses you have shown me, I thank you.

I now have the great honor and pleasure of presenting to you the President-Elect of the New Hampshire Medical Society, Dr. Osmon H. Hubbard of Keene.

PRESIDENT-ELECT HUBBARD: Gentlemen of the New Hampshire Medical Society, I thank you for the honor you have conferred upon me in electing me as your President. It is an office I never expected to hold. I feel that there is a great responsibility that goes with it, and I will give my best endeavors to make it a success during the coming year. [Loud applause.]

[Adjourned, sine die, at 6:20 p. m.]

REGISTRATION

The following members, visiting delegates and guests were present:

Frederic P. Lord, Hanover
Henry C. Sanders, Jr., Claremont
Fred E. Clow, Wolfeboro
H. O. Smith, Hudson
O. H. Hubbard, Keene
J. J. Cobb, Berlin
F. M. Dinsmoor, Keene
H. O. Chesley, Dover
J. C. Lawlor, Dover
Pierre Bergeron, Manchester
Ezra C. Jones, Manchester
E. B. Eastman, Portsmouth
S. T. Ladd, Portsmouth
H. H. Amsden, Concord
J. M. Birnie, Springfield, Mass.
R. L. Leak, Middletown, Conn.
M. T. Stone, Troy
H. T. French, Hanover
H. J. Connor, Concord
John H. Lambert, Lowell, Mass.
John F. Gile, Hanover
John J. Boardman, Hanover
C. P. Ballard, Penacook
F. S. Eveleth, Concord
W. P. Clare, Portsmouth
A. H. Harriman, Laconia
R. Gibson Perry, Sr., Wells River, Vt.
Henry Ladd Stickney, Rutland Heights, Mass.
Louis C. Ager, Waterloo
Joseph Theriault, Concord
David R. Brown, Concord
George C. Wilkins, Manchester
C. L. Smart, Laconia
E. P. Hodgdon, Laconia
George E. Leete, Concord
C. I. Cole, Goffstown
Robert O. Blood, Concord
W. R. Garland, Plymouth
C. F. Nutter, Nashua
W. F. Taylor, Keene
A. L. MacMillan, Jr., Concord
Anna M. Littlefield, New London
A. L. Wallace, Nashua
W. C. Rowe, Concord
Charles H. Dolloff, Concord
D. E. Sullivan, Concord
J. C. Huckins, Plymouth
Robert J. Graves, Concord
J. F. Edgerly, Hopkinton
Harris E. Powers, Manchester
F. L. Hawkins, Meredith
James W. Jameson, Concord
Mary S. Danforth, Manchester
Charles H. Cutler, Peterborough
Russell Wilkins, Manchester
Louis O. S. Wallace, Suncook
G. W. Weymouth, Lyme
G. S. Foster, Manchester
P. H. Greeley, Portsmouth

A. W. Mitchell, Epping
James S. Black, Nashua
A. W. Burnham, Lebanon
R. J. Bennett, Dover
T. F. Rock, Nashua
C. E. Butterfield, Concord
F. N. Rogers, Manchester
S. G. Davis, Nashua
Alphonse F. Raynes, Portsmouth
Charles Duncan, Concord
A. B. Woodman, Springfield, Vt.
Ralph H. Barker, Derry
Blanche H. Barker, Derry
Carleton R. Metcalf, Concord
Anna C. Rudd, Durham
Benjamin P. Burpee, Manchester
Berton D. Thorpe, Newport
L. H. Cogswell, Warner
Thomas W. Luce, Portsmouth
J. J. Buckley, Dover
J. J. Topham, Dover
Chancey Adams, Concord
David W. Parker, Manchester
Ethel M. Newton, Concord
Howard N. Kingsford, Hanover
Montfort Haslam, Concord
Benjamin E. Sanborn, Manchester
William N. Rogers, Sanbornville
Alvin A. Lucier, Nashua
R. W. Robinson, Laconia
L. E. McKinlay, No. Haverhill
J. F. Robinson, Manchester
G. M. Crowell, Suncook
D. C. Norton, Manchester
R. W. Tuttle, Alton
F. E. Spear, Woodsville
A. T. Downing, Littleton
William T. Frary, Boston
John F. Holmes, Manchester
S. G. Morrill, Concord
C. E. Dunbar, Manchester
E. J. Brown, Manchester
A. L. Merrill, Manchester
E. J. Delaney, Concord
F. P. Scribner, Manchester
Mary A. Sweeney, Nashua
F. C. Stewart, Manchester
C. O. Coburn, Manchester
W. R. Sanders, Derry Village
D. E. McIvor, Concord
M H. Towle, Manchester
G. T. Sheehan, Manchester
A. S. Mangurian, Manchester
J. A. Hunter, Dover
A. C. Alexander, Penacook
H. C. Pickwick, Lisbon
N. D. Michou, Manchester
John Deitch, Manchester
A. Pratte, Keene
Ira J. Prouty, Keene
C. H. Parsons, Penacook
V. E. Bolduc, Sanford, Me
Alfred Daudelin, Nashua
M. G. Wiley, Laconia
E. P. Lunderville, Berlin
H. E. Siske, Glencliffe
Alfred Love, Providence, R. I.
George F. Dwinell, Manchester
F. M. Allen, New York City
A. B. Howard, Concord
N. W. MacMurphy, Belmont
A. J. La France, Laconia
S. Fraser, New Boston
E. J. Gage, Laconia
G. D. Tibbetts, Antrim
F. O. Claggett, Newport
George H. Tuttle, South Acton, Mass.
S. Finney, South Acton, Mass.
F. H. Sargent, Pittsfield
Arthur N. Day, Concord
George A. Weaver, Bradford, Vt.
W. H. Tarbell, Contoocook
W. P. Grimes, Hillsboro
F. B. Argue, Pittsfield
Emery Fitch, Claremont
Marion L. Bugbee, Concord
Fred J. Cotton, Boston, Mass.
H. A. Des Brisay, Hanover
H. B. Crawford, Hanover
Loren A. Sanders, Concord
Granville E. Hoffses, Manchester
W. A. Bartlett, Manchester
George L. Hilton, Milford
Fred Fernald, Nottingham
Thomas M. Dudley, Concord
Chas. F. Keeley, Claremont
C. J. Bartlett, New Haven, Conn.
William E. Reed, Nashua
Edward H. Egbert, Wolfeboro
C. J. Monette, Plymouth
Jas. Sutcliffe Hill, Bellows Falls, Vt.
John P. Lenahan, Bellows Falls, Vt.
D. L. Stokes, Rochester
John F. Merrill, Northwood
Charles S. F. Whitcomb, Contoocook
T. J. Morrison, Somersworth
Allen P. Richmond, Dover
W. E. Preble, Boston, Mass.
W. R. MacAusland, Boston, Mass.
George H. Sanborn, Henniker
Timothy Leary, Boston, Mass.
A. Myerson, Boston, Mass.
John S. Hodgson, Boston, Mass.
R. H. Marcotte, Nashua
George S. Emerson, Fitzwilliam
K. Churchill, Lebanon
H. M. Morse, Peterboro
L. B. Marcou, Berlin
Colin C. Stewart, Hanover
M. L. Harris, Chicago, Ill.
Bruce Snow, Manchester
W. A. Thompson, Manchester
B. W. Baker, Laconia
Abby N. Little, Laconia
Albert Dolloff, New Hampston
Charles A. Eastman, Somersworth
Ellen A. Wallace, Manchester
John G. W. Knowlton, Exeter
Otis M. Littlefield, Manchester
C. F. Flanders, Manchester
P. B. Goetschius, Manchester
R. G. Blanchard, Dover
J. B. Woodman, Franklin
J. N. Friborg, Manchester
C. R. Friborg, Manchester
F. C. Sweeney, East Jaffrey
Loren F. Richards, Nashua
Charles A. Weaver, Manchester
Carl A. Ottley, Burlington, Vt.
John H. Blodgett, Bellows Falls, Vt.
Leon M. Orton, Ashland
H. B. Carpenter, Portsmouth
G. A. Tredick, Portsmouth
E. H. Carleton, Hanover
Louis O. S. Wallace, Suncook
Adolph J. Provost, Manchester
H. L. Clow, Hathorne, Mass.
E. D. Burtt, Lincoln
Dr. Robbins, Lunenburg, Vt.
Leonard B. Morrill, Center Harbor
O. C. Young, Charlestown
Robert Flanders, Manchester
George V. Fiske, Manchester
George W. Hatch, Wilton
William G. Ricker, St. Johnsbury, Vt.
William H. Little, Lancaster

Hon. Charles W. Tobey, Temple
C. S. Abbott, Laconia
A. Normandin, Laconia
H. S. Hutchinson, Milford
T. C. Pulsifer, Berlin
F. M. Robertson, Bristol
George M. Watson, Manchester
A. W. Hopkins, W. Swanzey
W. P. Clough, New London
E. A. Tracey, Keene
E. H. Robbins, Somerville, Mass.
L. T. Togus, Manchester
Henry H. Dearborn, Milford
J. J. Morin, Rochester
J. S. Bragg, Manchester
Arthur G. Holland, Boston, Mass.
William Hale, Gloucester, Mass.
Frank R. Cox, Middleton, Mass.

MISCELLANY

NEW HAMPSHIRE'S SCHOOL COURSE IN HYGIENE FOR GIRLS

In New Hampshire 756 babies were born in 1929 to mothers between the ages of 15 and 20 and 10 to mothers under the age of 15. During the same year 195 girls under the age of 18 and 1,102 between the ages of 18 and 20 were married. In view of these facts, the division of maternity, infancy, and child hygiene of the State board of health has organized a course of seven lectures on personal, social, maternity, and child hygiene to be given each year for girls in the principal high schools, to be followed by a study course on the preschool child.—*Note from the U. S. Department of Labor, Children's Bureau, Washington.*

REMOVALS

Dr. George F. Dwinell, Manchester, removed to 814 Elm Street, Manchester.

Dr. Charles A. Eastman, Somersworth, removed to 51 Western Avenue, Berlin.

Dr. Henry L. Stickney from Rutland Heights, Mass., to U. S. Veterans' Hospital, Sunmount, N. Y.

VERMONT STATE MEDICAL SOCIETY

THE DIAGNOSIS AND TREATMENT OF HAY FEVER*

BY JAMES D. TRASK, M.D.†

THE diagnosis and treatment of hay fever is based on clinical experience and laboratory experiments. The first treatments were done by a doctor on himself. The reactions were so severe that the method was abandoned as impractical. This was long before the conception of allergy was developed. However, when some features of allergy as exemplified by anaphylaxis were elucidated by laboratory experiments the specific treatment of hay fever was able to be applied successfully.

The experimental disease in animals shows some resemblances to the natural disease in man. But it must be remembered that the two are not the same and it is the general principles of resemblances and not the actual manifestations of the principles which can be directly transposed from experiments in animals to practice in man. Thus guinea pigs respond to shock chiefly with respiratory symptoms while dogs respond with intestinal symptoms. Both animals may be killed but the guinea pig is much more easily killed. Rats, on the other hand, are sensitized with difficulty. Naturally then, man differs from other animals in this respect and as you all know men differ among themselves. The hereditary factor is important in man, in eczema, urticaria, hay fever, asthma, and allied allergic diseases. These diseases, if they occur naturally in animals have not been studied.

In discussing the experimental sensitization and anaphylactic shock a few of the cardinal points as observed in guinea pigs are presented below:

1. Sensitizing dose.
2. Incubation period.
3. Period of sensitivity.
4. Shocking dose.
5. State after shocking dose.

1. The sensitizing dose must contain protein. It may be administered by injection, by mouth, by inhalation, or sensitization may be accomplished in utero. The size of the dose may be very small. The minimal sensitizing dose is about ten times smaller than the minimal shocking dose.

2. The period of incubation is from ten to twenty days.

3. The sensitive state then follows. This state may be transferred to a normal animal passively by means of the blood of the sensitive animal. Thus in practice in transfusions in man it is necessary to be careful if the donor has asthma.

The degree of sensitivity depends to some extent on the individual peculiarities of the animal. The duration is longest when the sensitizing dose has been largest, and may last for days or for the life of the animal. The presence of the sensitive state is demonstrated by the shocking dose.

4. The shocking dose must be closely related biologically to the sensitizing dose. Thus specificity is not absolute. An animal sensitized to horse serum is shocked best by horse serum but can also be shocked by mule serum. So in hay fever if a person is sensitive to the pollens of several early summer grasses which are biologically related, the commonest—timothy pollen—will suffice for the treatment of all. But timothy pollen will not suffice for the treatment of late summer hay fever due to weed pollens which are biologically unrelated to the grass pollens. In these latter cases ragweed pollen must be used.

Animals sensitized with a whole protein may be shocked with certain fractions of it. This is important in considering people who are sensitive to aspirin, quinine, cocaine and other drugs. The size of the shocking dose need not be large. In many cases 1/100 of a c.c. will suffice. Shock is most easily produced if the shocking dose is given intravenously, least easily if given subcutaneously. The symptoms of shock vary on the one hand from restlessness and sneezing to rapid death on the other. Animals thus killed have greatly distended lungs as if they had suffered a severe attack of asthma. The more quickly symptoms follow the shocking dose the more likely it is that the shock will be fatal. If no symptoms appear within thirty minutes probably no severe shock will occur.

Sensitive animals give a general specific reaction. They also give a local specific reaction, and if small amounts of shocking dose are injected into the skin a local edema and erythema develops. This is the analogy to the diagnosis by means of skin tests in man.

If the animal is not killed by the shocking dose—that is if he received only a fraction of the fatal dose—he becomes desensitized and within an hour can be safely given multiples of the dose which shortly before would surely have been fatal. The more severe the shock the more secure the desensitization is. The duration of this period of desensitization is from seven to ten days, after which the animal becomes sensitive again. Thus in hay fever patients the treatment

*Read at the Annual Meeting of the Vermont State Medical Society, Bellows Falls, October 11, 1929.
From the Department of Pediatrics, Yale University School of Medicine, and the Pediatric Service, New Haven Hospital and Dispensary.

†Trask—Associate Professor of Pediatrics, Yale University School of Medicine. For record and address of author see "This Week's Issue", page 286.

must be continued to within a week of the end of the pollen season and must be repeated each year. But in man with the natural disease desensitization is nowhere nearly as complete as in the experimental disease. On the other hand people tend to outgrow hay fever, some after a few years, some only after the best part of a life. In some the treatments seem to accelerate the development of this natural immunity. Accordingly there are patients who appear to be permanently cured by the treatments. The only way to find out if this has occurred is by trial.

Let us now turn to the treatment of hay fever. There are two general types of the disease, the seasonal variety caused by pollens and the perennial variety caused by other inhalants,—horse dander and other animal danders, feathers, house dust and especially orris root in face powders and sachets. Both varieties are diagnosed by history and skin tests. The importance of the history is indicated by the tabulation:

Season	Plant	Pollen
April	Trees	
May to July	Grasses	Timothy
Aug. 15 to Frost	Weeds	Ragweed

The tree season is short—two weeks—and it is hardly worth while treating for tree pollen sensitization. Timothy pollen suffices for the early summer cases. Occasionally plantain will have to be added. Ragweed suffices for the late summer and fall cases. Those who suffer all summer and fall need both timothy and ragweed. Many people think goldenrod causes their trouble. As a rule they are wrong. This pollen is heavy, is not blown about, and unless the contact is extremely close, therefore, does not cause hay fever. However, wherever there is goldenrod there is also ragweed. This pollen is light, is blown about, the air will be full of ragweed pollen and the people will sneeze.

The difficulty that comes in the specific treatment of hay fever is due to the fact that there exist various grades of sensitivity among people. It is obvious, since many never have hay fever, that some people are sensitive and others not. It is less obvious, but equally true, that among the hay fever people some are exquisitely sensitive, others moderately so. Thus a series of doses which may be exactly right for Mr. Brown, may not be strong enough for Mr. Smith, and yet may give Mr. Jones an extremely severe general reaction. If the latter happened very often there would not be much pollen extract sold. Accordingly, these extracts are made weak. As a result it is difficult to get pollen extract strong enough for some patients. But by and large very good results may be obtained with the material furnished by the firms that sell these preparations. These manufacturers are also coöperative about furnishing especially strong material when it is needed.

After the diagnosis has been established by the history and the skin tests, it is necessary to decide how sensitive the patient is. This is accomplished in two ways:

1. By the local reaction to different dilutions of the test material.

2. By the reactions to the series of therapeutic doses.

The preliminary classification is made by the first method and this held to or changed according to the way the patient reacts to the treatments.

The treatment sets consist of four bottles each containing a different dilution of the pollen extract. In the series each bottle is ten times stronger than its neighbor. The tests are done by injecting exceedingly small volumes (two hundredths of a c.c.) of these dilutions intracutaneously. This makes a wheal about a millimeter in diameter. If no local reaction occurs in five minutes, inject a similar dose from the next bottle and if no reaction develops in five minutes, the next, and so on. The reaction to look for is an increase in the size of the wheal to five to ten millimeters in diameter, with the development of an irregular border and erythema surrounding. If the weakest or next to weakest bottle gives this reaction the treatment set will fit the patient and the scheme of dosage that goes with the outfit will probably give a satisfactory result. If the weakest bottle gives a much stronger reaction than that described, the person is probably one of that 2 or 3% of extremely sensitive hay fever patients who would probably have a general reaction even to a test with the strongest bottle, and it would be best to send the treatment set back to the manufacturer with a statement of the case and ask for a weaker set with a scheme of dosage to fit the special patient.

If, on the other hand, only the strongest bottle gives the reaction described and not in a well marked manner at that, the set will probably be too weak for the patient and stronger material with a new scheme of dosage should be procured.

The scheme of treatment requires fifteen to eighteen gradually increasing doses. These are given once or twice a week. The maximum dose should be reached at the beginning of the pollen season and continued until the last week or two of the period of pollination. Thus the treatment should begin seven or fifteen weeks before the pollen season, depending on whether the injections are given twice or once a week. A few people get relief if treatment is not begun until the pollen season. This is not so good a method as the preseasonal and seasonal method combined.

The check on the classification by the skin tests with the dilutions in the treatment sets is obtained by noting and recording on the patient's card the size and duration of the local reaction which follows each dose in the plan of treatment. If the local swelling and itching persist for two days and tend with each dose to be more marked, the patient will probably have

a general reaction after the next dose or so. To avoid the general reaction do not pass on to the next dose but keep repeating the last dose until the local reaction becomes less marked. Then in proceeding with the doses cut the calculated increase in two. That is, let the next dose lie midway between the last dose and the next strongest called for on the scheme of treatment.

The general reactions vary in intensity from a generalized urticaria breaking out forty-five to ninety minutes after the treatment to shock and asthma occurring within a minute or two. The ordinary general reaction lies between these extremes and consists in coughing and then asthma, occurring in ten to twenty minutes after the treatment. Such attacks as these are immediately relieved with epinephrine 0.3 c.c. intramuscularly. To be ready for the emergency of a general reaction one should have the epinephrine in the syringe before the treatments. This not only obviates the confusion of finding and loading the syringe but one can note whether the epinephrine has become slightly colored and thus probably deteriorated, or whether it is crystal clear and colorless and thus potent.

The more quickly the symptoms develop the sharper will be the reaction. If no reaction occurs for forty-five minutes it will consist of a general urticaria or at most of a short attack of wheezing which will also be relieved with epinephrine.

The only shock I have seen, fortunately was not fatal. It occurred in a woman who had a supply of ephedrine capsules at home. She had been having slight general reactions after she had left the clinic for the past three treatments. But as she was subject to asthma and the attacks were quickly relieved with ephedrine she answered our questions about the local reactions by saying that they were insignificant and were without any general symptoms. Immediately after the fourth treatment the severe general reaction with shock and unconsciousness occurred. She was not entirely recovered until twenty-four hours later. Then the details about the relief of the previous reactions with ephedrine was brought to light. She never came back to the clinic.

In general those who have reported their results find about three quarters of patients get worth while relief. Our results are about the same. The class of people who get the greatest relief are those who have hay fever and asthma in late summer and fall, and in whom the asthma lasts on until the first part of the winter. Many of these people get great relief, not only from the hay fever but also from the asthma. A few patients get permanent relief from the hay fever. The only way to test for this is to try a season without treatment.

We use nose and eye drops as adjuvants to the treatment. There are without doubt many effective preparations on the market. Ours is as follows:

Cocaine	.1
Boric Acid	1.
Adrenalin	7.5
Water q.s. ad	30.

S. Gtts. I or II in eyes and nose p.r.n.

I think you would be interested in the studies of Cooke and his collaborators on hay fever. These papers have appeared from time to time in many journals. A recent summary of their work written by Vander Veer, Cooke and Spain appeared in Vol. 174 of the *American Journal of Medical Sciences* for 1927.

OBITUARY

Dr. Edmund Towle Brown was born July 18, 1871 in Bridgewater, Grafton County, New Hampshire. He received his early education in the schools of Bridgewater, Ashland, Sanbornton and New Hampton Literary Institute. He received the degree of Doctor of Medicine from the University of Vermont in 1897. He then practiced medicine in Montgomery Center until 1908, after which he did postgraduate work in the diseases of the eye, ear, nose and throat. He was professor of the diseases of the eye, ear, nose and throat at the University of Vermont. He was attending clinical surgeon of the diseases of the eye, ear, nose and throat of the Mary Fletcher Hospital and attending surgeon of the Bishop DeGoesbriand Hospital and of the Fanny Allen Hospital. From 1909 until 1916 he was attending oculist and aurist of the Champlain Valley Hospital, Plattsburg, N. Y.

Dr. Brown was a member of the Burlington and Chittenden County Clinical Societies, Vermont State Medical Society, a Fellow of the American Medical Association, a Fellow of the American Academy of Ophthalmology and Oto-Laryngology, and Fellow of the American College of Surgeons. He was a member of Burlington Lodge No. 100 A.F. & A.M.; Burlington Chapter No. 3 R.A.M.; Burlington Commandery No. 2 K.T.; a Noble of Cairo Temple, A.A.O.M.S.

Dr. Brown died at his home, Burlington, Vt., June 4, 1930 of angina pectoris.

MISCELLANY

VERMONT DEPARTMENT OF PUBLIC HEALTH JUNE 1, 1930

Communicable diseases reported during the month are as follows: chickenpox, 96, diphtheria 1, German measles 9, measles 196, mumps 1, scarlet fever 25, whooping cough 62 and tuberculosis 28.

1,722 examinations were made by the Laboratory of Hygiene during June, classified as follows:

Examination	
For diphtheria bacilli	84
For Widal reaction of typhoid fever	22
For malarial parasites	0

For tubercle bacilli	261
For evidence of syphilis	384
For gonococci in pus	129
Of blood for contagious abortion in cattle	65
Of water, chemical and bacteriological	152
Of water, bacteriological	144
Of milk, market	186
Of milk, submitted for chemical only	5
Of milk, submitted for microscopical only	16
Of foods	188
For the courts, miscellaneous	9
For courts, autopsies	3
Autopsies to complete death returns	0
Miscellaneous	74

In the Division of Communicable Diseases 42 cases of syphilis were reported and 50 cases of gonorrhea. Six cases reported to the Department for treatment and 29 were treated privately. 470 Wassermann outfits and 186 slides were distributed during the month.

Ninety patients were seen during the month by the nurses of the Poliomyelitis After-care Division, 86 in their homes and 4 at the Burlington office. 98 home visits were made, 72 of which were polio cases and 26 non-polio. 43 new pieces of apparatus were fitted, 14 pieces of apparatus were altered or repaired, 50 orthopedic corrections made to shoes, 1 plaster cast removed and 1 patient returned home from the Fenway Hospital. Sales made by the vocational worker amounted to $20.00.

Nine preschool children's clinics were held by the State Advisory Nurse of the Maternity and Infancy Division. At these clinics approximately 475 children were examined.

THE SURVEY OF THE MEDICAL FACILITIES OF VERMONT

The Committee on the Costs of Medical Care, of Washington, D. C., is to undertake certain studies in the state of Vermont this summer. This national organization, which has many prominent physicians among its members, is engaged in a five-year program of research in the field of medical economics. It is financed by the Rockefeller Foundation, the Milbank Memorial Fund, and other foundations. The Chairman of the Committee is Ray Lyman Wilbur, M.D., Secretary of the Interior, and two of the members of the executive committee are Walter P. Bowers, M.D., of Boston, and Walter R. Steiner, M.D., of Hartford, Connecticut. Dr. Olin West, Secretary, and Dr. M. L. Harris, President of the American Medical Association, are members of the general Committee.

In Vermont an extensive survey will be made covering the most important economic aspects of the medical facilities of the state. In addition two counties will be studied in some detail,—every physician, dentist, druggist, nurse and other practitioner will be interviewed. The local hospitals will be included in the county studies, as well as the public health work being done.

For the state-wide study, mail questionnaires will be sent from Washington, D. C. to all physicians not included in the county surveys. Schedules will also be mailed to the dentists, pharmacists, nurses and others. The official and voluntary health organizations will be surveyed, especially from the viewpoint of the expenditures made. All the hospitals in the state will come under the scope of the study.

Vermont is the only state that will be studied as a whole by the Committee on the Costs of Medical Care. If the physicians coöperate, much valuable information will be obtained. The physicians will be requested not to sign the questionnaire so that their identity will remain unknown. If every physician completes his return, the profession in Vermont will learn many facts of advantage to them. The results of the survey will be published and available to all those interested.

The Committee has consistently tried to interest physicians in the work under way because it is probable that many important facts pertaining to the studies being carried on can be furnished by practitioners.

Here is an opportunity to give valuable aid and encouragement to the Committee on the Costs of Medical Care.

MEDICAL PROGRESS

PROGRESS IN ANESTHESIA

BY L. F. SISE, M.D.,* AND P. D. WOODBRIDGE, M.D.*

THE following report includes no definite period of time. Recent developments are covered, and in many instances the events leading up to them are also followed. References have been found to be so numerous that it is felt best not to give a summary of each one, but rather to set forth a general account of the subject in hand and append references as indicated.

Fifteen years ago the specialty of anesthesia was represented by a comparatively few men scattered throughout the country, working separately, and largely unknown to each other. To anesthetize and to etherize were then nearly synonymous. Today every large city has its group of physicians who are giving their entire time to anesthesia.

It is now believed that every well organized modern hospital should have a department of anesthesia with a physician at its head who is a competent anesthetist[14]. Martin states[88] that "no hospital organization is complete without a service or a department of anesthesia under expert direction. The head of the department should carry the same responsibility for the service as the chief of surgery, the chief of medicine or any other department head."

The specialty is well organized, having regional societies which cover the entire country and whose members, besides attending their regional meetings, convene once a year in the Congress of the Anesthetists of the United States and Canada. The official journal, *Current Researches in Anesthesia and Analgesia*, is published bimonthly by the International Anesthesia Research Society.

At the present time the chief anesthetics are ether, procain, nitrous oxid and ethylene; and there are a few newer claimants such as sodium iso-amylethyl barbiturate and tribromethanol.

During the past few years there have been gradual changes in the use of these anesthetics, and at the present time certain general tendencies are clearly discernible. In the urban centers of the United States chloroform has been very nearly abandoned. While ether is still the most popular anesthetic, there is a very distinct drift away from it. This drift seems to be turning toward gas anesthesia and regional anesthesia, including spinal anesthesia. For the last two years spinal anesthesia has been enjoying a considerable wave of popularity.

ETHER

Ether is still the most popular and generally useful anesthetic. Stanton[118] sent a questionnaire to members of the American College of Surgeons asking what types of anesthesia they used for the ordinary, average laparotomy. Of 640 who replied, 555, or 85 per cent., used ether alone, while of these it is rather surprising to learn that 60 per cent. used the ether "straight". Thirty-three, or 5 per cent. used ethylene, and only one used chloroform. Over half of those answering tried to avoid ether with the poor risk patient. In doing this, three-quarters used local anesthesia or local and gas anesthesia. Miller[94], in his usual thorough-going manner, compares a series of patients under ether with a similar series under nitrous oxid. He finds fewer complications and a lower mortality rate under ether, and concludes: "If the same attention had been paid to improving the technique of etherization that has been spent on other anesthetics, ether would now be recognized as the safest and most efficient of anesthetic agents."

Ether is used mainly by simple inhalation with nitrous oxid-oxygen induction. An extremely popular method on the continent is that of Ombrédanne. This method was introduced into Germany in 1926 by Henkel[58]. The apparatus consists of a hollow metallic ball filled with felt saturated with ether, a breathing bag, and an adjustment by which various combinations of outside air and ether-laden air or various amounts of re-breathing may be administered[13, 139, 97, 142]. We have used this apparatus a number of times and find it very good for an anesthesia of light or medium depth, but not sufficiently powerful to give a deep anesthesia suitable for abdominal operations.

The intratracheal method of administering ether is used considerably more by the British and Canadian anesthetists than it is by those of the United States[121, 122, 107, 87, 65, 53, 136]. Thomson of Edinburgh uses it in upper abdominal operations to induce quiet respiration[127]. Rowbotham uses it[108] (1) in head and neck operations, (2) where there is blood in the upper respiratory passages, and (3) in lung surgery. Hewer uses gas-oxygen-ether by the intratracheal route[60, 61] and feels that it has the following advantages. First, minimum respiratory movement. Second, maximum muscular relaxation. This is because the patient cannot get respiratory obstruction from laryngeal spasm. Third, protection from operative shock. Fourth, absence of pulmonary complications.

Intratracheal insufflation has been used for many years. Recently to and fro breathing through an intratracheal tube has been developed. Flagg has used such to and fro breathing with ether for many years, but has recently brought it to a much greater degree of perfec-

*Sise—Anesthetist, Lahey Clinic. Woodbridge—Anesthetist, Lahey Clinic. For records and addresses of authors see "This Week's Issue", page 286.

tion[26, 27, 28]. His intratracheal catheter has been developed with great care in conjunction with Chevalier Jackson. While this catheter is excellent, the ingenious one devised by Guedel and Waters seems to us preferable[44]. The essential part of this catheter is the collar which makes it fit the trachea. This collar is of thin rubber, is flat and inflatable, and fits the catheter snugly. It may be inflated by means of a small rubber tube that runs along the catheter itself. When this collar is gently inflated to the proper extent it just fits the trachea and makes an air and water tight fit. This prevents the inhalation of blood or of fluid even with to and fro breathing.

Several observers have shown that if during tonsillectomy under ether anesthesia the patient is deep enough to abolish the swallowing reflex, blood is aspirated into the tracheobronchial tree, while if the patient is light enough to be able to swallow, the blood goes into the stomach[26, 28, 29, 129]. This was determined by examining the patient by means of a bronchoscope and esophagoscope immediately after operation. May, Thoburn and Rosenberger have shown by x-ray studies that blood aspirated into the tracheobronchial tree during tonsillectomy disappears from there either immediately, before the end of the operation, or within a six-hour interval thereafter[59].

The Gwathmey method of oil ether colonic anesthesia has caused considerable discussion since it first appeared in 1913[45]. Hatcher, in a complete review of the subject for the Council on Pharmacy and Chemistry, while admitting some advantages, is on the whole critical[56]. He says: "It causes some irritation of the intestines in every case, severe and even fatal irritation with hemorrhage in an undetermined number, which, however is small." "It probably causes greater injury to the liver than does inhalation of ether in corresponding amounts." Speaking of the use of morphine and ether together, he says: "There is ample evidence that . . . numerous deaths have resulted from their combined use." He criticizes the term "painless childbirth" as being quite misleading.

Gwathmey himself, however, remains quite enthusiastic[46]. He recounts 5000 cases without a death which could in any way be attributed to the method, though "a slight diarrhoea in less than six cases occurred, which quickly passed off in one or two days."

In the technic given, the rectum is cleaned thoroughly, the last enema being two hours before operation. Morphine gr. 1/8 and chlorbutanol gr. 10 are then given, and in thirty minutes atropin gr. 1/150. One hour before operation a retention enema of 4 to 6 fluid ounces is instilled which contains paraldehyde 2 drams and ether and olive oil in the proportion of 2 to 1. Ten to fifteen minutes is required to give this. Forty minutes before operation 3 ounces ether and 1½ ounces oil are instilled, taking 10 minutes. Danger signals are slight cyanosis, dulled lid reflex, or stertor.

When this technic is used in obstetrics, quinine is added to the enema and appears to be essential to combat uterine inertia.

In 1926 there began to appear what seemed to be a new complication of ether anesthesia, namely, ether convulsions. These were reported by the late S. R. Wilson of the Manchester Royal Infirmary, England[128]. These convulsions began under full, deep anesthesia. They appeared first in the eyelids and face and then spread over the entire body, causing death in less than an hour. The patients were all young and suffering from other forms of toxemia such as acute appendicitis or gas gangrene. After an investigation Wilson concluded that the convulsions were due to impurities in the ether—acetaldehyde and peroxid, acting in addition to a toxemia already existing in the patient. Walton cites a case having convulsions during ether anesthesia with three further attacks of convulsions after return to the ward but with recovery[131]. Examination of the ether used showed much acetaldehyde and peroxid. He agrees with Wilson that the convulsions are probably due to acetaldehyde. Hadfield presents a complete discussion of the subject with analyses of different brands of ether under varying conditions and disagrees with Wilson as to the causation of the convulsions, believing them due to idiosynerasies on the part of the patient, together with contributing causes such as toxemia and youth[19]. Discussion of this paper brought to light nineteen more cases. The general opinion was that the best method of treatment was the withdrawal of ether and the use of carbon dioxid and oxygen. Several cases of recovery with this treatment were reported.

THE GASES

The use of the gases, both nitrous oxid and ethylene, has become very extensive in recent years. There has been no essential change in their ordinary use for general surgery except perhaps for a tendency to use rather more preliminary medication.

The work and teachings of McKesson have had a powerful influence in the field of nitrous oxid. He has practiced his technic of secondary saturation successfully for some years[90], as have numerous others. This method, however, because it entails extreme oxygen want, is not generally accepted, and is thought by many to have elements of danger, especially in the hands of the less skillful.

He and many others believe nitrous oxid much the best anesthetic for nose and throat work, especially tonsillectomy[91]. Evans cites 6000 tonsillectomies done under nitrous oxid without ether and 10,000 done with the addition of some ether[33, 34]. He believes nitrous oxid is pleasanter and less toxic than ether and allows the protective reflexes to return almost instantane-

ously. An interesting point which he makes is that nitrous oxid obviates the inhalation of ether by the surgeon. With ether anesthesia the surgeon is sometimes obliged to inhale ether in considerable amounts so that it interferes with his well-being and is disagreeable to office patients whom he may see later.

Hollis, Clay, and Ruth present an excellent account of tonsillectomy under nitrous oxid in the forward inclined sitting position[62]. Due credit is given Denman[20] and McKesson, who have used this technic for years. The advantages claimed are that practically all blood drains out of the mouth instead of obscuring the field or running down into the trachea or oesophagus; and that reflexes return so quickly on termination of the anesthesia that any blood which has managed to get a short distance into the trachea is quickly expelled.

Nitrous oxid is the preferred anesthetic of the dentist, especially for extraction. McKesson[92], from a questionnaire answered by 130 exodontists, found that 80 per cent. used nitrous oxid in 75 per cent. of their operations. With handicapped patients, 71 per cent. preferred it. Ruth strongly favors nitrous oxid as the best and safest anesthetic for all forms of oral surgery and gives excellent details of technique[110]. He finds it especially indicated (in preference to regional anesthesia) where a large number of teeth are to be extracted at one sitting or where other extensive operations are to be done.

Nitrous oxid and ethylene are being used to some extent by the intratracheal route. Some prefer to make the introduction of the catheter under ether and then continue with the gas alone[54]. Others use little or no ether[41, 42].

The use of the gases in this way has been facilitated by the recent tendency to the use of large catheters enabling to and fro breathing; such as that of Flagg[37], but especially that of Guedel and Waters[44], which makes an air and water tight joint with the trachea.

By means of this catheter Waters has also been able to use his method of carbon dioxid filtration. He has demonstrated that with this technique a dog may be placed under water for a period of an hour without aspiration of water or other untoward effects and that similarly a patient's mouth may be filled with water[44].

The question of the danger from fire and explosion in the use of ethylene has been much discussed and various schemes have been proposed to lessen this danger. Hornor and Gardenier worked out a most ingenious device for intercepting and stopping an explosion on its way from the breathing bag to the face mask[63]. We have seen this most interesting apparatus demonstrated and can state that it worked perfectly on repeated trial. Its bulk, however, seemed to us to make it impractical. A very useful suggestion is that of washing out the ethylene from the gas machine with carbon dioxid at the end of an anesthesia. Another valuable suggestion is that of increasing the humidity of the air, as has been done in industry[132, 133]. It has been suggested that the ethylene be conducted from the expiratory valve of the mask directly out of the operating room by means of a hose attached to the valve[112]. This would have the added advantage of removing the odor of ethylene from the room. Somewhat complicated but probably quite effective systems of grounding and metallic connections have been suggested[59].

Salzer sent a questionnaire to 478 hospitals in the United States with a capacity of 200 beds or more[113]. He received figures for 332,721 definite ethylene anesthesias and for about 425,000 estimated anesthesias. "Only ten explosions were reported, one in about 42,000, or a record which ether cannot begin to approach." This article is bitterly attacked by Lee[73], who, by his quotations from the article, appears to feel that Salzer is more concerned about the safety of the surgeon and anesthetist and even of the equipment than he is about that of the patient.

Williams presents an excellent paper for the Council on Physical Therapy in which he calls attention to various dangers of ethylene and ether anesthesia and suggests remedies for them[137].

Most of the subject matter of this article, however, is included in the splendid report of the Committee on Anesthesia Accidents of the American Medical Association submitted by its chairman, Yandell Henderson[67]. This report presents a full and authoritative discussion of the dangers attendant on the use of inflammable anesthetics. It should be read especially by anyone using the gas machine for inflammable anesthetics such as ethylene or nitrous oxid ether. Henderson calls attention not only to the explosive danger of ethylene but to that of ether especially when used in a gas machine, although ether thus used explodes "much less readily or violently" than ethylene. He finds that with ethylene the hazard of explosion is probably less than 1 in 100,000. This he feels is quite small as compared with other causes of death, such as postoperative pneumonia, and he states that modern apparatus and methods probably kill less than one patient by explosion for each 100 they save from death by pneumonia. The danger of less than anesthetic concentrations of ethylene is shown, such concentrations being within the explosive range of ethylene. Thus obstetrical analgesia with ethylene is very dangerous. In the fatal obstetrical case at Ann Arbor the patient was being given 75 per cent. oxygen and 25 per cent. ethylene, the most highly explosive mixture which can be obtained. His chief recommendations are that insulating material be eliminated from the gas machine and that the operating room be kept at a relative humidity of sixty or above. This latter would be feasible in winter, but in summer would make

the room unbearably muggy. Grounding is not recommended.

Cheney and Folkman present a most interesting study of the concentration of ethylene obtained in an ordinary operating room[22]. They found that at distances of ten feet or more from the mask the concentrations were so small as to be indeterminable. Only within one foot above the mask or two feet in the direction of the exhaling valve were there explosive mixtures. With a cloth shield and the exhaling valve pointing to one side there was a safety factor of ten in the abdominal region.

Stander finds ethylene the least toxic of general anesthetics[117]. Brumbaugh tried to clear up some of the disputed points about ethylene, using normal subjects for experiment[15]. He found there was no combination with hemoglobin, no change in the icterus index, no destruction of blood, no change in the coagulation or bleeding time or in the character of the blood clot. There was no appreciable destruction of the blood cells and no appreciable derangement of the biliary system. There was a marked increase in the blood sugar running up to 45 per cent. above normal, with a fall practically to the pre-anesthetic level in the next twenty-four hours. There was no immediate change in the blood urea after anesthesia, but in the next twenty-four hours there was an increase up to 19 per cent. The postanesthetic morbidity—headache, nausea and vomiting—was much greater than usually encountered in patients undergoing operative procedures. This was felt to be due possibly to the comparative absence of postanesthetic care.

Straus and Rubin found under ethylene a diminution in the coagulation time of the blood and to a lesser extent in the bleeding time, which returned to normal, however, in twenty-four hours[124]. This diminution may have been due to carbon dioxid built up by the closed method, since carbon dioxid diminishes coagulation time, as shown by Chipman[23].

ETHYL CHLORID

Little is written about ethyl chlorid, it being generally considered too dangerous for anything but induction. Yet the Forsyth Dental Infirmary is said to have given ethyl chlorid over 123,000 times during a period of fifteen years to children ranging in age from three to fourteen years, without accident.

REGIONAL ANESTHESIA

Regional anesthesia in past years has made tremendous strides under the leadership of such men as Braun, Finsterer, Farr and Labat. In most recent years little that is new has been contributed, but the use of the method has increased, and its technique has been standardized and refined. Such refinements are suggested by McKnight[93]. He brings out the point that many other matters besides actual technique of injection itself are important if we are to obtain satisfactory regional anesthesia. Such other matters include proper pre-anesthetic medication, the proper choice of drug—namely, procain—the proper selection of cases, and proper surgical technique. Lundy presents in minute detail the refinements of technique found most efficient for producing anesthesia of the sacral nerves[80, 81]. In the same way he presents a detailed account of the various techniques found most efficient for operations on the neck[82]. He finds this latter anesthesia especially indicated for such operations as laryngectomy, thyrotomy, excision of esophageal diverticulum, excision of cervical and submental glands and of thyroglossal ducts, phrenicotomy, and cervical laminectomy.

Procain is, by general agreement, the most suitable drug for the various forms of regional anesthesia. Many new drugs, however, are being brought out and there is promise that before long we may have one which will be better than procain for certain purposes, at least. One such drug may be percain. This is not a member of the cocaine-procain series, but is the hydrochloride of diethyl-ethylene-diamide of alpha-butyl-oxycinchoninic acid. The lethal dose of percain is one-fifth that of cocaine but its anesthetic power is ten times that of cocaine. Solutions of 1 to 1000 and 1 to 2000 are effective for anesthetic purposes. The duration of anesthesia is much longer than that with procain[24, 128]. In America this drug is called "Nupercain," to avoid confusion of sound with the word "procain".

SPINAL ANESTHESIA

During the last few years spinal anesthesia has enjoyed a tremendous growth and is now the leading subject of interest, as shown by the fact that during the last year many more articles were written concerning it than concerning any other one subject. While this growth has been due to a number of different factors, one of the important points in initiating and sustaining it has been the introduction of ephedrine and the utilization of its supporting action on the blood pressure during spinal anesthesia. The indefatigable work of Pitkin has also had its effect.

In 1926 Chen began calling attention to the usefulness of ephedrine[18, 19, 20, 21]. In 1927 fifty cases were reported in which it was used in spinal anesthesia with favorable results[109, 98]. In February, 1928, one of us (L. F. S.) reported its use in sixteen high anesthesias[115]. Since that time its use has grown rapidly until now it is used as a prophylactic almost universally.

Most modern writers show a strong drift toward procain as the anesthetic drug preferred.

While an infinite variety of techniques obtains, yet most modern users may be very roughly divided into two schools. The first school uses a simple solution of procain in spinal fluid. There

is sufficient dilution so that the anesthetic solution is not appreciably heavier than the rest of the spinal fluid. The height of the anesthesia is regulated by volume, by force (timing)[123] and by decompression. The chief exponent of this school is Labat[70, 71, 72, 73].

The second school uses an anesthetic solution of lighter specific gravity than the spinal fluid. Height is obtained in the same way as above, but may be obtained also by altering the position of the patient. The chief exponents of this school are Babcock and Pitkin. Babcock has been for many years the chief exponent of spinal anesthesia and has probably done more of these anesthesias than anyone else in America[3, 4, 5, 6, 7, 8, 9, 10, 11].

Pitkin has perfected a light solution with low diffusibility[100, 101]. He claims that when this solution is used, extension upward of the anesthesia may be greatly lessened or prevented by placing the patient in the Trendelenburg position. Pitkin has done much to popularize spinal anesthesia.

Koster has recently aroused great interest by means of his general spinal anesthesia[67, 68]. For his general anesthesia Koster uses 200-250 mgm. of neocaine dissolved in 8 c.c. of spinal fluid and injected "under the force and at the rate of an ordinary hypodermic injection." Under this anesthesia he is able to do operations in any part of the body including the chest, neck and head and operations within the nose and mouth. Pitkin and McCormack have used a solution heavier than the spinal fluid and with this have been able to limit their anesthesia to the sacral nerves only[102].

Isenberger feels that there is a definite interrelation between depression of circulation and the depression of respiration which is caused by drugs of the cocaine-procain series[74]. This holds true both for regional anesthesia and for spinal anesthesia. Thus, artificial respiration or stimulation of respiration is valuable in combating the circulatory depression of spinal anesthesia. We have ourselves seen dogs in collapse from a spinal injection which completely paralyzed them from head to foot, resuscitated by means of artificial respiration alone. This respiration, however, employed negative as well as positive pressure.

Rygh and Bessesen reviewed 250,895 cases of spinal anesthesia from the literature and found the mortality to be 1 in 3345[111]. An extensive bibliography is appended. Tendler, in an excellent paper, reviewed 326,910 cases from the literature including no series of cases under five hundred, and found the mortality to be 1 in 4086[126]. In contrast to these figures, one of us (L. F. S.) has shown what happens when a method of such potential danger is used by numerous men who have not a large experience with it[116]. The death rate in Greater Boston during the first year of the considerable use of spinal anesthesia was shown to be probably between 1 in 100 and 1 in 200.

ARTIFICIAL RESPIRATION

The most interesting apparatus recently brought out is that of Drinker[32]. This is essentially a large metal cylinder in which the body of the patient is placed, leaving his head outside. A pump and controls enable positive and negative pressures to be alternated within the cylinder at any rate or pressure desired. It appears to be the most effective apparatus for artificial respiration yet devised.

BARBITURIC ACID DERIVATIVES

The use of these derivatives has increased greatly in recent years. They have many interesting and important uses outside of the field of anesthesia, such as their use as simple hypnotics, their use in convulsions, for postoperative or intractable pain, for postoperative nausea and vomiting, etc. They are also effective as part of preliminary medication.

Mott et al.[93], in experiments on cats and monkeys, found that hypnotic drugs both of the barbitone and of the sulphone series administered intensively for seven days or more produced mucoid degeneration in the central nervous system. This, however, has not been confirmed.

The first use of the drugs of the barbituric acid series for the production of anesthesia appears to be that by Fredet[39]. Somnifen, as he called his preparation, at first consisted of diethyl barbituric acid and allyl-isopropyl barbituric acid. It was found, however, that the action of the first of these substances was too slow and prolonged and later only the last of these two was used. Fredet found that allyl-isopropyl barbituric acid was picked up in the blood, mainly by the corpuscles. In the body the greatest concentration was in the central nervous system and next in the spleen, while there was little in the liver or kidney. There was only slight effect on the heart or respiration and little effect on the liver or kidney. It was eliminated very slowly unchanged in the urine, taking about twelve days; but its elimination was not increased by diuresis[99, 86].

This drug, allyl-isopropyl barbituric acid, is now called Numal[25]. Luquet, in reporting Clement's observations, draws attention to the question whether numal like somnifen may not have some action on the heat centers and cause postoperative fever. Coudray reports a second series of 50 cases and from these 100 cases concludes that the anesthesia obtained from numal is deep enough for the ordinary abdominal operation[27]. Patients sleep 5 to 7 hours after operation; 7 per cent. to 8 per cent. are restless on awakening; 12 per cent. have retention; and 9 per cent. have postoperative vomiting. There is no evidence that it causes postoperative fever.

Steiner reports 170 cases favorably, liking its effect particularly with old people and long operations[120].

Very few in this country appear to have used these drugs, though Fjelde reports a series of obstetrical cases under somnifen[35].

In this country the barbituric acid derivative which has been used most extensively in anesthesia is sodium iso-amylethyl barbiturate, marketed under the trade name "Sodium Amytal." Zerfas and McCallum have made a general study of this drug[140, 141]. It appears to have no toxic action on any of the vital organs. Elimination is not definitely determined, but appears to be mainly through the kidneys unchanged. There are no tissue changes post mortem, even when the drug is given in large amounts over a long period. There may be slight decreases in the urinary excretion, with acetone in a few specimens, but there is no decrease in the phenolsulphonphthalein excretion and no rise in the nonprotein nitrogen of the blood. There is a slight rise in the blood sugar but not above normal. The drug may be administered by mouth, by rectum, intramuscularly, but, for purposes of anesthesia, preferably intravenously. The preparation of the solution, its dosage and administration are described. Patients go to sleep in about five minutes, usually without excitement and with a striking absence of untoward sensations. There is usually prolonged postoperative sleep of several hours and frequently a further considerable period of drowsiness or amnesia which is very grateful to the patient.

Lundy has found this drug to be extremely useful in a variety of conditions[83, 84]. He recommends that it be preceded by chloretone or morphine, and does not approve of very large doses such as are necessary for complete anesthesia alone. Anesthesia should be completed by the addition of some other anesthetic. With very large doses, restlessness, delirium, stupor or pulmonary edema may be seen. He calls attention to the postoperative danger from respiratory obstruction due to falling back of the tongue. This is an extremely important point, not only with the barbiturates, but with tribromethanol, and other injection narcoses. We believe that many of the cases in the literature where death has been reported as due to late respiratory depression have in reality been caused by unrecognized partial respiratory obstruction.

Pernocton was developed by Bumm by combining the barbituric acid radical with a bromin radical, giving sodium sec butyl-bromallyl barbiturate[16]. Hartung reports on his views in over 6000 cases (with 52 fatalities)[55]. He evidently feels that it should be used with great care and as a basal anesthetic only, stating that complete general anesthesia should never be attempted. He also feels that morphin or barbital should not be used with it nor should local anesthesia be used in addition. A very extensive literature in German has developed concerning this drug.

Another valuable use of barbituric acid derivatives in anesthesia has to do with their protective action against the toxic effects of drugs of the cocaine-procain series. The beneficial effect of the barbiturates is exerted against the convulsive action of these drugs only and not against their depressive action. It has been shown that, if a barbiturate is first employed, two or three times the dose of one of these anesthetic drugs can be given without producing convulsions as can be given if a barbiturate is not first employed[125, 66, 76].

TRIBROMETHANOL

Tribromethanol or avertin was synthesized in Germany and has been used there since 1926[17]. This drug has been used experimentally in America for about a year and is now on the general market. Most of the literature concerning it is in German. Lundy, however, presents in English a very good account of the whole subject with a complete review of the literature concerning it, including a bibliography of 176 references[85]. He describes in detail the administration and action. The intravenous use is mentioned. He tabulates 22,826 cases, dividing them into four classes. In the first class, which includes series of 1000 or over, the mortality was 0.15 per thousand. In the second class, which includes series of 500 to 999, the mortality was 0.35. In the third class, which includes series of 101 to 499, the mortality was 1.24 per thousand. In the fourth class, which includes series of 100 or less, the mortality was 1.58. Another good review is in the *International Abstract of Surgery*[1]. Here it is stated that animals given this drug for long periods show no tissue changes, but several human deaths have been reported in which intestinal erosion and fatty degeneration of the liver and kidneys were found post mortem.

A possible explanation of the deaths from fatty degeneration of the liver may be found in an article by Lucas, as mentioned by Lundy. Lucas found that bromine derivatives of hydrocarbons when used as anesthetics were broken down in the body, and that the resulting substances might cause damage to the liver[77].

Guttman writes a very favorable article which contains useful practical details[48]. He appends a bibliography which he states contains reports of over 100,000 cases without the report of a single fatality. It is important not to heat the solution materially above 40° C., since heat decomposes the drug with the formation of bromic acid and dibromacetaldehyde. These two substances are toxic and irritative and may cause serious damage to the patient. The drug is usually given by enema in 3 per cent. solution. A safe dose is 0.1 gm. per kilogram of body weight and a maximum is 0.15. A dose usually satisfactory is 0.13. Sleep commonly occurs in about five minutes, but rapidly merges into a real anesthesia. As with all injection

narcoses, however, it is often necessary to add some other anesthetic, such as gas or ether, and usually so if a very deep anesthesia is to be had with safety. There is a considerable tendency toward a fall in blood pressure. Respiration is quiet; but, because of the muscular relaxation, great care must be taken to see that it does not become obstructed from falling back of the tongue.

We have liked this drug, but have used it only in quite a limited field. This field has included comparatively young individuals and operations which were either long and requiring but a light degree of anesthesia, or which were for toxic thyroids. We have felt it unsuitable for the elderly, sclerotic, weak, septic, or starved individual.

Tribromethanol itself is somewhat slowly soluble in water. It has, therefore, been proposed to dissolve it first in amylene hydrate[114]. It is claimed that besides increased solubility this solution has the advantage of being more stable and of depressing the respiratory center less. Tribromethanol is now generally supplied in this solution.

While most writers recommend a 3 per cent. solution of tribromethanol, Kotzoglu recommends a 2½ per cent. solution, feeling that it has the advantage of a more prolonged effect with less danger of untoward symptoms at the beginning of anesthesia[69].

MISCELLANEOUS ANESTHETICS

Cyclopropane

Lucas and Henderson present a study of cyclopropane on animals[78]. They had considerable difficulty in getting pure specimens of the gas. The impure specimens showed toxic effects—some fall in blood pressure, salivation and flexor clonus of the hind limbs even in deep anesthesia. Pure specimens of the gas, however, proved an extremely good anesthetic. Respiration failed before the heart and circulation. The heart was very little affected. The gas is heavier than air and is explosive in 5 per cent. concentration and up with oxygen, but with air it does not explode in mixtures above 10 per cent. The same authors find that anesthesia is produced in cats by 10 per cent. to 11 per cent. concentration and in rabbits by 14 per cent. to 15 per cent[79]. Toxic features do not appear rapidly except when the concentration reaches 18 to 20 per cent. The hydrogen ion concentration of the blood and the blood sugar are altered very little. The carbon dioxid combining power is slightly raised. They find that this anesthetic has a closed ring formula so that it is probably very inert. "Cells of body do under deep narcosis carry on their ordinary resting metabolism unaffected by the anesthetic."

Propylene

Propylene was at first thought to be a very good anesthetic[104, 52]. Further experience, however, has shown that it is apt to cause delayed circulatory depression. Electrocardiograms show that it produces frequent ectopic beats even in non-anesthetic concentration, while in higher concentration it frequently causes an ectopic ventricular tachycardia[2, 103].

Acetylene

Acetylene has been used somewhat for gas anesthesia upon the continent but has received rather sparing attention in this country[40]. It is much more powerful than ethylene, being effective in 70 per cent. concentration, or less, but is much more readily explosive than ethylene, and hence has not been looked upon with favor.

Ethyl Alcohol

Constantin describes general anesthesia by means of ethyl alcohol as used by M. G. Marin of the Military Hospital, Mexico City[26]. Marin has done 700 operations on animals and 300 on humans under this anesthesia. Ninety-six per cent. ethyl alcohol is used intravenously in conjunction with isotonic glucose. The technique is described in detail.

Chloralose

Vincent and Thompson describe anesthesia with chloralose[120]. This drug, injected intravenously, differs from most other anesthetics used in this way, in that it raises the blood pressure. By repeated injections, the blood pressure may be sent up to more than twice normal. Stimulation of the sciatic and anterior crural nerves produces no effect on the blood pressure, but stimulation of the splanchnic nerve causes a remarkable rise.

Hedonal

Donald gives a complete and detailed account of the action of hedonal, or methylpropylcarbinol urethane, on animals, and proposes it as an intravenous anesthetic in human surgery[31]. He finds it has marked anesthetic action, giving muscular relaxation similar to that of chloroform. There is a fall in blood pressure of about 27 per cent. which may, however, be largely prevented by using gum acacia solution as the vehicle for the injection. Respiration ceases well before the circulation.

MISCELLANEOUS

Stander investigated in animals the tissue changes produced by various anesthetics[117]. He found degenerative changes in the liver after ether, nitrous oxid or ethylene, which were least after ethylene. There were also degenerative changes in the epithelium of the convoluted tubules of the kidneys except with ethylene. Anoxemia produced marked degeneration and necrosis in the liver, and minor changes in the convoluted tubules. Morphine and chloretone produced no lesions. Chloral produced intense congestion but no serious cell injury. Barbital,

urethane and paraldehyde gave pronounced liver changes with little or none in the kidney.

Rosenthal and Bourne have made some interesting experiments on liver function under various anesthetics[105]. The experiments were carried out on dogs and the function was tested by the bromsulphalein test. They found that one-half hour of chloroform anesthesia caused injury which required eight days for functional recovery, and that two hours of anesthesia caused injury which required six weeks to return to normal. Ether produced a definite impairment of function which returned to normal in twenty-four hours. Nitrous oxid and ethylene produced no change in hepatic function except when anoxemia was present, when both immediate and delayed toxic effects were observable. Large doses of morphine caused considerable depression of function, but with complete recovery in twenty-four hours. They conclude that of these general anesthetics ethylene would seem to be the anesthetic of choice for operation in severe liver disease.

Haines and Milliken have shown that ether markedly lowers the renal function in experimental animals, that morphine and atropine in the usual doses do not unfavorably affect kidney function, and that morphine and atropine largely prevent the unfavorable action of ether; and they believe that clinical observation suggests that the same holds true with human beings[50, 51]. They believe that ether lowers the kidney function through a vasoconstricting action, that albumin and casts seen after etherization are due to a subsequent vasodilatation, and that morphine acts by preventing the vasoconstriction of ether. Stehle and Bourne essentially confirm their findings[119].

Luduc's electric anesthesia is still receiving some attention. It is claimed that both general and local anesthesia may be obtained by a direct current of some thirty volts which is interrupted at the rate of 4000-5000 times a minute[12].

Waters describes a method of gas anesthesia by which the carbon dioxide is removed by soda lime filtration so that a high amount of rebreathing can be used and great economy of gas obtained[134, 135].

Leake and Waters describe the anesthetic properties of carbon dioxide[74]. They find that 30 to 40 per cent. with oxygen will anesthetize mice, rats, cats and dogs in one minute or less. The blood pressure rises rapidly at first and then remains normal. Breathing is deep but not labored. Clonic convulsions occasionally occur which may be stopped by the admission of oxygen. The blood pressure is greatly raised by 10 to 20 per cent. carbon dioxide. Over 40 per cent. tends to depress respiration and circulation, while anoxemia becomes evident with concentrations over 80 per cent. It is not recommended as an anesthetic for human beings at present, especially where hypertension is present.

Gwathmey and Hooper present a strong plea for preliminary medication[47, 48]. This is based partly on general grounds, but partly also on the special ground that it prevents or lessens postoperative pulmonary complications. They anesthetized animals with various anesthetics, some of the animals having preliminary medication with morphine and magnesium sulphate, and some having no medication. On post mortem examination the lungs of the controls showed distention, edema, congestion and petechiae, while those receiving preliminary medication were "relatively normal".

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CASE RECORDS
of the
MASSACHUSETTS GENERAL HOSPITAL
and the
PETER BENT BRIGHAM HOSPITAL
ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

EDITED BY RICHARD C. CABOT, M.D.
F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 16321

INABILITY TO WALK

MEDICAL DEPARTMENT, PETER BENT BRIGHAM HOSPITAL

This case is published through the coöperation of the staff and administration of the Peter Bent Brigham Hospital.

A native born housewife of thirty-six entered the medical service December 3 complaining of inability to walk.

The family history and past history are not remarkable.

Present illness. Eight years ago the patient had acute shooting pains in the legs and was given six intravenous and numerous intramuscular injections at the Massachusetts General Hospital. The legs were numb and she felt as if she "walked on feathers". Two years ago either leg would give way at times and she would fall, but recover immediately. She began to develop a peculiar gait, and nine months before admission her right leg suddenly ceased to function and could only be dragged along. There was no pain. After seven weeks in bed she found that she could walk, but had to hold on to something to keep from losing her balance. She had no tendency to fall in any particular direction. For the past twelve months her left leg had become progressively thinner. One month ago her hair began falling out evenly over the entire scalp. Three or four weeks ago both legs began to feel cold both subjectively and to touch. For the past four weeks the tips of her fingers had felt numb. For the past eight weeks she had often felt as if she had to void urine, but could not do so.

Physical examination at admission showed a fairly well nourished woman with prominent frontal bones. Scant, fine brown hair; no spotty loss of hair. Skin dry, with fine scaling. Left pupil egg shaped and larger than right; both reacted to accommodation but not to light. Retinal examination negative. Blood pressure 110/80. Heart, lungs and abdomen negative. Biceps and triceps reflexes hyperactive. Pain sensation absent in tips of all fingers. Deep sensibility present throughout both arms. In the legs the Achilles and Oppenheim reflexes and patellar reflexes were absent. No ankle clonus. No Babinski. In her toes she had no sense of perception in space. Heel to knee test showed marked loss of coördination. Marked ataxia and positive Romberg on walking and standing. Both legs markedly hypotonic. Heat and cold could be differentiated. Both legs of normal temperature. Pain sensation was absent over both legs throughout. The left leg showed diminished sensation to touch below the middle third of the tibia. On the right, pin prick and light touch were not appreciated below the upper third of the tibia anteriorly and below the Achilles tendon posteriorly. Vibration sense was absent in both legs.

Clinical and laboratory notes. For the first ten days of her stay the temperature, pulse and respiration were normal; she then had a slight chill, nausea, and vomiting and the temperature rose to 102° with pulse 100, following which the temperature remained between 99° and 102° for the remainder of her stay, with pulse of 100 to 120 and respirations 20 to 30. The urine was negative until the thirteenth day, when it was found to contain 15 to 25 leukocytes per high power field. All subsequent urine examinations showed specimens loaded with leukocytes. The blood on admission showed hemoglobin 70 per cent (Talqvist), 3,780,000 red cells, 13,250 leukocytes with 83 per cent polynuclears. The smear showed moderate achromia, marked anisocytosis and poikilocytosis, no stippling. The leukocyte count on December 13 and for the four following days was 12,500, 15,000, 12,800, 16,400 and 24,800; December 21 24,600, December 22 23,000, December 24 35,000, December 26 53,000. Wassermann positive, Hinton negative, modified Hinton positive. Stools not remarkable. Lumbar puncture December 3: fluid clear, cell count 4, globulin negative, gold curve 4443331 (positive type 2), total protein 60, Wassermann (spinal fluid) negative. Lumbar puncture December 23: the spinal fluid was under a very low pressure, with practically no rise on jugular compression; cells 5, globulin (Pandy test) + +, ammonium sulphate negative. Gastric analysis was essentially negative.

Course. For the first nine days in the hospital the patient's course was uneventful. On the tenth day she had a chill, nausea and vomiting, with temperature rise to 102°. The temperature continued as given. On examination there was slight dullness over the left upper chest with fine crackling râles and increased breath sounds. She raised no sputum. The respirations never went above 30. An X-ray film of the chest next day was normal. On the fifteenth day the level of anesthesia was found to be unchanged since admission. The bladder showed retention of urine. She was catheterized several times following this and at other times was incontinent. She was given two doses of mercury

succinamide intramuscularly and two of neoarsphenamine, but after the onset of temperature was given daily mercurial inunctions instead. She continued to grow weaker and remained unconscious for the last five days, with no other change except slightly weaker pulse. Twenty-four days after admission she suddenly became cyanotic and the respirations ceased.

Clinical Discussion

BY RICHARD C. CABOT, M.D.

NOTES ON THE HISTORY

In most of the cases which we have discussed at this hospital this year the record starts in this way, "Family history and past history not remarkable." So far as concerns the family history that is what we usually have to say. It is in only a very small percentage of cases that we get anything of value out of the family history.

The sharp shooting pains in the legs were diagnosed, I suppose, as the lightning pains of tabes and she was given antiluetic treatment. Tabes is more common in men than in women.

The history of the present illness certainly points to some disease of the spinal cord. Of the diseases of the spinal cord tabes is suggested on account of the pains, the pupils, the ataxia, the bladder symptoms, the loss of certain reflexes, the hypotonicity and the positive Wassermann test.

NOTES ON THE PHYSICAL EXAMINATION

The prominent frontal bones were possibly related to syphilis. The skin makes us think again of syphilis.

The description of the pupils is that of Argyll-Robertson pupils.

It is a pretty good rule that any sort of queer anomalies of sensation are consistent with tabes. It is hard to name any that are not.

We look for some intercurrent infection as a cause for all that rise in temperature and in the leukocyte count. It seems to be a urinary infection.

The abnormalities in the blood are perhaps due to the same condition that later caused the pus in the urine and the temperature. The smear is characteristic of secondary anemia. The cell count in the lumbar puncture fluid is against the diagnosis we have been making, but it is consistent with it in patients who have been under treatment for a good while.

It would be natural to suspect pneumonia and it was rather surprising to have a normal X-ray.

DIFFERENTIAL DIAGNOSIS

We can be positive she had chronic disease of the spinal cord. We can be positive she had urinary infection. I see nothing against tabes. I do not see how we can make any other diagnosis.

A Student: How can you explain that spinal block? There was no rise on jugular compression.

Dr. Cabot: I do not think that is proof of spinal block. But I do not see how it could be explained.

A Student: How can you exclude multiple sclerosis?

Dr. Cabot: I do not see how anyone ever can exclude multiple sclerosis in a case like this. It is a dangerous thing to exclude it in any obscure disease of the central nervous system. I am in favor of tabes.

CLINICAL DIAGNOSIS

Tabes dorsalis.

DR. RICHARD C. CABOT'S DIAGNOSIS

Tabes dorsalis.

ANATOMIC DIAGNOSES

Multiple sclerosis.
Acute bronchopneumonia.
Thrombosis of the lateral sinus.

Pathologic Discussion

BY S. BURT WOLBACH, M.D.

Multiple sclerosis or Charcot's disease.

At post mortem the spinal cord showed on section sharply demarcated translucent areas scattered without any uniformity in the posterior columns, the anterior columns, the lateral columns. Upon examination of the brain we found scattered throughout the white matter gray or dark gray areas widely distributed. In the occipital region there was quite a large lesion. Histologically these lesions were characteristic of those described as multiple sclerosis, the loss of myelin sheaths accompanied by very marked gliosis. The more recent lesions contained lipoid laden cells and perivascular lymphoblastic infiltrations such as have been described in multiple sclerosis.

There was an acute bronchopneumonia.

Then we had a finding which we cannot account for satisfactorily, a thrombosis of the lateral sinus, puriform thrombi with leukocytes and bacteria demonstrable in the smear. I cannot explain this, although I think it is of some importance in explaining the terminal events in the patient's life.

Dr. Cabot: Were we wrong in saying urinary infection?

Dr. Wolbach: No. I forgot to mention that there was cystitis and pyelitis. We interpret that as of paralytic origin.

There were thrombi in the pulmonary arteries. I presume that and the lateral sinus were connected.

Dr. Cabot: Anybody who is willing to ex-

clude multiple sclerosis in such a case when he remembers the extraordinary number of clinical pictures which we have seen associated with it is a rash man. I think we can scarcely exaggerate the variety of clinical pictures we can get with multiple sclerosis. The only thing that was much against tabes was the cell count in the spinal fluid, and if there had been very active treatment recently that would not have been at all extraordinary. Certainly there are few cases of tabes that show no increase of cells.

DR. WOLBACH: Did any of the clinicians who saw this patient make the diagnosis of multiple sclerosis?

DR. REGINALD FITZ: No; they merely brought up the possibility.

CASE 16322

UNEXPLAINED EMPYEMA, APPENDIX ABSCESS, JAUNDICE, DEATH

SURGICAL DEPARTMENT

PRESENTATION OF CASE

DR. OLIVER COPE*: This is the story of an Italian laborer sixty-six years old who spoke but little English. He had three admissions to the hospital.

First admission. A year ago last February he entered with a two weeks' history of fever and pain in the right side on breathing, starting with a chill. He had a dry unproductive cough. Up to this time he had always been well. When he came to the Emergency Ward he had moderate fever, leukocytosis and signs of fluid in the right chest. An exploratory puncture was done. Two sorts of fluid were drained; one turbid straw-colored fluid from the eighth space and the other from the ninth space, thick pus which showed necrotic material and a few pus cells. Thoracotomy was done. A note was made at that time that he felt pain in the right shoulder. That was only transient, however. He was on the surgical service about three weeks. After the thoracotomy the temperature went up rather than down, although the chest had been drained surgically. There was some question as to what the process was. The patient refused to eat. He was finally transferred to the medical service because of the supposed intrapulmonary process. He responded with a good appetite and in about four weeks he was discharged afebrile. He apparently got on pretty well.

Second admission. We next heard of him last August. He had had merely one day of severe pain in the right lower quadrant, nausea and vomiting, no fever,—a very short history. He had been at work at odd times before that. Operation was done by Dr. Linton. An appendix abscess was drained and the appendix removed. There was no exploration of the abdomen at that time because of the abscess. His course following appendectomy was normal and he was discharged from the hospital with the wound well healed about three weeks later.

He apparently recovered perfectly well outside the hospital. He soon went back to work as a day laborer and worked for three months. He was then laid off because of unemployment, not because of feeling poorly. A month before his third admission, May 18, he first noticed mild steady non-radiating pain in the epigastrium, never very severe, but more or less constant. Three weeks before admission he began to vomit, and from that time until admission he vomited nearly everything he ate. Usually he vomited shortly after eating and the vomitus contained only food, no blood or fecal material. He noticed that his stools were a little light. His bowels had moved more or less regularly during that time. Two weeks before entrance his family noticed that he was jaundiced. His stepson said that during the month of illness he had noticed very marked decrease in weight.

Third admission. When the patient entered he was very obviously deeply jaundiced. He had slight fever and a leukocyte count of about 20,000. He was very thin, with hollow cheeks and sunken eyes, and showed a very obvious loss of weight. He had tenderness with mild spasm in the right upper quadrant. There was a suggestion of something beneath it. Nothing could be felt. The liver dullness was somewhat increased. No liver edge was felt. No masses. Rectal examination was negative. He had a moderate secondary anemia. His blood smear showed a high leukocytosis, 93 per cent polymorphonuclears; no eosinophiles seen on the smear. He was on the ward for ten days before death. His course was gradually downhill. He vomited nearly everything that was given him, requiring subpectorals and intravenous injections. After five or six days he became somewhat irrational and uncoöperative and to give these injections required a special nurse. The staff never thought his condition warranted exploration. At arrival he was too weak and they felt he ought to be built up. Instead of gaining he went steadily downhill. X-ray examination with a barium enema was negative. A chest film revealed nothing in particular except a tortuous aorta. We attempted a gastrointestinal series. Seventy-five per cent residue was found in the stomach, but nothing further. A later examination was not made because the X-ray Department felt that the patient was too sick.

The roentgenologist was unable to tell anything about the duodenum in the fluoroscopic examination. We felt that the residue, the vomiting, the tenderness and spasm in the right upper quadrant and the deep jaundice—he had a van den Bergh of 21.75 which remained high—pointed to probable carcinoma of the biliary passages. He developed a septic parotitis and pneumonia. Ten days after admission he died.

*Senior interne on the West Surgical Service.

CLINICAL DIAGNOSES (FROM HOSPITAL RECORD)

Abdominal malignancy.
Septic parotitis.

ANATOMIC DIAGNOSES

Amebic abscess of the liver.
Acute lobar pneumonia.

Pathologic Discusssion

BY TRACY B. MALLORY, M.D.

The autopsy findings in this case were quite surprising I think to everybody. He had a very much enlarged liver showing a single big rounded prominence. When we cut into that we found an abscess nearly 15 centimeters in diameter filled with mucopurulent material in which there was an unusual proportion of mucus. The abscess was lined with necrotic tissue.

The only other finding of significance was the upper lobe of the right lung, which showed a definite lobar pneumonia. His appendix had been removed and a careful search of the intestinal tract showed no lesions whatever.

When some of the material from this liver abscess was examined freshly on a warm microscopic stage it was found to be filled with active amebae in large numbers. We then got out sections of his appendix, which had been removed some time before, to see if we had missed something. We cannot find any amebae in that and we still cannot find any primary focus in the region of the intestine.

DR. ROBERT R. LINTON: What would you say was the duration of the abscess?

DR. MALLORY: I would have no idea on that at all. They can be extraordinarily chronic. They may last for years. I think this certainly had been present for months. I do not know whether it was present at the time of the appendectomy. That seemed to be a genuine acute appendix histologically.

The only other finding is in the lung, which you see is typical lobar pneumonia. There are a few cases in which amebic abscesses in the liver have given rise to amebic abscesses in the lung, but I do not think we need suppose any such thing in this case.

DR. FRANCIS T. HUNTER: What do you suppose that chest tap showed?

DR. COPE: Repeated cultures were sterile, and nothing was found on smear beyond this necrotic material and some pus cells.

DR. MALLORY: It is not impossible that amebae might have been found in it by repeated direct examinations.

DR. COPE: I was reviewing the note made at the time of the thoracotomy. The thoracotomy tube evidently touched the diaphragm. The lower fluid was necrotic pus. The fluid above was clear. Later, on the medical service, a tap showed brown fluid.

DR. HUNTER: Was that on the right lung?

DR. COPE: Yes.

DR. MALLORY: These cases are so rare here that I know almost nothing about them from personal experience; but the stories of Indian officers who come back and suffer from liver disorders for twenty or thirty years afterwards point to the extreme chronicity of the process even with definite abscess formation.

DR. COPE: How often do you find liver abscess without bowel lesions?

DR. MALLORY: I think that is quite unusual.

DR. COPE: In other words, would bowel lesions persist?

DR. MALLORY: I think they would. Here we have to make one of two assumptions; either the lesion was in the large intestine so that it healed and there was nothing to attract our attention to the site, or that appendix was possibly an amebic lesion and we failed to pick up the organism in the routine sections which were made. I do not think that at all impossible.

DR. LINTON: He had an unusually easy convalescence after the first operation. He had from four to six ounces of pus and a very large appendix abscess.

DR. MALLORY: I am beginning to think that if that material had been examined at the time of appendectomy on the warm stage we should have found amebae.

ORDERS

May 18. Rest in bed. Fluids ad libitum. High carbohydrate low fat diet*. Codeine grain i with aspirin grains x by mouth every three hours p.r.n.

*Breakfast. Fresh fruit. Cereal. One boiled or dropped egg. One slice toast. ½ small square butter. Two ounces whole milk. Three teaspoons sugar. Coffee or tea.
10 a.m. Four ounces orange juice. One ounce lactose.
Dinner. Two ounces chicken. One baked potato. One medium serving of 5 or 10 per cent vegetable. Salad with mineral oil dressing. One slice bread. ½ small square butter. Gelatine or other fat-free dessert. One glass fat-free milk. Two or more teaspoons sugar. Tea if desired.
3 p.m. One glass of fat-free milk or cocoa made with fat-free milk. Two crackers.
Supper. Beef broth, skimmed free of all fat. Macaroni, rice, etc., one serving. 5% or 10% vegetable. One slice bread. Two crackers. ½ small square butter. 20% fruit. One glass fat-free milk. Two teaspoons sugar. Tea if desired.

May 20. Codein grain i, aspirin grains x by mouth every three hours p.r.n.
May 21. Repeat order of May 20.
May 27. Rectal tap water eight ounces every four hours alternating saline and glucose.
May 24. Omit rectal tap water until tomorrow afternoon, then continue as before. Magnesium, glycerine and water enema in the morning.
May 26. Morphia one-sixth grain s.c. every three hours p.r.n.
May 27. Repeat order of May 26.
May 28. Morphia one-sixth grain s.c.

Note on the diet: High carbohydrate in order to supply easily available calories,—maintain alkali reserve or at least ward off acidosis and keep up the glycogen level in the liver. Low fat to lessen the demands on the liver in digestion.

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CANCER RESEARCH

IN spite of the amount of work which is directed toward the discovery of the cause of cancer and toward methods of cure, the moment has not yet arrived when we can say that we have conquered this ever increasing disease. Some cases can be cured, others helped, but far too many, especially after metastases have occurred, are doomed. There recently appeared by Geschickter a summary of the work which is being done in Europe on this problem.* Investigations as to the cause of cancer are being pursued along various lines. One of the oldest of these is the attempt to cause cancer by the use of carcinogenic agents, such as chemical irritants. The most prevalent mode of study of the origin of cancer is that conducted upon tumor filtrates with the Rous chicken sarcoma. A more recent line of investigation, introduced by Otto Warburg of Berlin and his associates, consists of the study of the metabolism of living tumor tissues. Warburg believes that cancer tissue is unique in the extent of its glycolysis. Other investigators have turned their efforts towards an attempt to find a general systemic cause for cancer, and still others have directed their attention to a study of human tumor cells growing in vitro.

As regards the situation abroad, Geschickter says, "Thus, a survey of the cancer laboratories in Europe reveals uncertainty and speculation in regard to the cause of malignancy and yet there is evidence everywhere of an attack upon the problem along more fruitful and scientific lines."

Work on the diagnosis of cancer, Geschickter finds to be relatively fruitless as yet. The most valuable advance of recent years he believes to be the method of freezing freshly excised tissue and cutting sections for immediate microscopic examination; this method, which was popularized largely by the work of Bloodgood, McCarthy and Terry, he finds is used in America more than in Europe.

Work on the treatment of cancer has proceeded along diverse lines. The use of colloidal lead has been abandoned by most European clinics where it has been tried. The attempt to utilize vital dyes in the treatment of cancer has not yielded any promising results as yet. The development of immunity to cancer by means of the injection of serum from an immunized individual is still in the experimental stage. Warburg's and Sokolof's attempts to influence tumor metabolism are interesting, but not yet conclusive. Warburg attempts to starve out the tumor cells by interference with their sugar and oxygen supply while Sokolof has reported experiments in which the tumor cells were injured by an opposite metabolic effect, i.e., overoxygenation by means of too rapid breathing.

The one therapeutic agent in which interest is still strong is radium. In the use of this element the most thorough and scientific work is being carried out at the Pasteur Institute in Paris by C. Regaud and his associates. They have found that as a primary form of therapy, radium is successful only for cancer of epidermal origin. In other lesions its use is purely palliative.

It is rather surprising that after some fifteen years during which we have employed radium, certain fundamental facts about its action are still unknown. The relative value of large but brief applications compared with applications of much smaller doses continued over longer periods is not settled. The present view seems to be that the latter method is the more effective. The solution of such questions as this can only be reached by careful clinical observations, for it has been impossible thus far to grow human cancer cells in vitro extensively enough to employ them in the study of this problem. Even if this could be done, other factors are involved in the living patient.

A very interesting and helpful investigation

*Recent Work on the Cancer Problem, Charles F. Geschickter. *Jour. of Chem. Education*, Vol. 7, No. 5, May, 1930.

which bears on this question and presents in addition certain valuable observations on the nature of the reaction of tumor cells to radiation appears on page 247 of this issue of the *Journal*. Meigs and Parker, from their painstaking study of tissue removed day by day from malignant cervices treated by radiation, have proved that their cases fall into two groups. The first shows a marked rise in the number of mitoses on the third or fourth day following treatment; the second shows no such rise. The patients in the first group were all dead at the end of thirteen months; those in the second group were alive and well over two years following treatment.

As Geschickter says, "Progress in the realm of cancer research appears to be dependent upon a gradual accumulation of facts rather than upon revolutionary and outstanding discoveries." It would appear that Meigs and Parker in their paper have presented an observation which, if confirmed, may well be an important step in the long flight that leads to the mastery of malignant disease.

"ROGUES' GALLERY"

More than six months were required to compile the index of the new "Rogues' Gallery" of the New York City Department of Health. This index includes the names, aliases and records of over 25,000 medical quacks, "cure all" manufacturers, nostrum peddlers, diet inventors and all others who prey on the ill and gullible well.

The "gallery" was compiled by the National Better Business Bureau at the request of the Department of Health, the work being carried out, we read in the official release from the Department, under the direction of Special Deputy Health Commissioner Edward F. Brown, who conceived the idea.

The thousands of folders disclose the life histories and careers of abortionists, medical crooks, quacks, charlatans; manufacturers of questionable medicines, worthless hair growers and poisonous tonics; peddlers of "Indian herb" concoctions; harmful cosmetics, including rouges, powders, creams, washes, toilet waters, lipsticks, etc.; manufacturers and peddlers of "horse collars" and other useless electric devices; "inventors" and peddlers of worthless diets, exercise and reducing systems; and a complete list of the manufacturers and analysis of tonics, patent medicines and other medical articles offered for sale in drugstores and other shops, which do not have the approval of the American Medical Association.

The efforts of Commissioner Shirley W. Wynne to rid the radio broadcasting field of medical quacks and other charlatans really marked the beginning of the work, for at that time he advocated the compilation of an "Indexus Expurgatorius" to be used as a guide by owners of broadcasting stations.

Since these restrictions applied only to New York City, Dr. Wynne appealed to the National Radio Commission, the United States Public Health Service and the Federal Trade Commission for a joint survey of the radio field throughout the country. It was while waiting for these organizations to take action that Dr. Wynne embarked the Health Department on the compilation of its own index.

This Rogues' Gallery is another step in the direction at least of putting a curb on quackery, for the rogue does not want to have his record known. It will supplement the work of the Bureau of Investigation of the American Medical Association and the National Better Business Bureau in exposing and cataloguing the crooks and in keeping that eye on them from which they are eager to hide.

THIS WEEK'S ISSUE

Contains articles by the following named authors:

Meigs, Joe Vincent. A.B., M.D. Harvard 1919. F.A.C.S. Surgeon to Out-patient Department, Massachusetts General Hospital, Huntington Memorial Hospital and Palmer Memorial Hospital. Surgeon, Pondville Hospital, Norfolk and Vincent Memorial Hospital, Boston. Nonresident Visiting Surgeon, Burbank Hospital, Fitchburg. Address: 264 Beacon Street, Boston. Associated with him is:

Parker, Frederic, Jr. A.B., M.D. Harvard 1916. Assistant Professor of Pathology, Harvard Medical School. Assistant Pathologist, Boston City Hospital. Address: Boston City Hospital, Boston, Mass. Their subject is: "The Effect of Radium on Cancer of the Cervix." Page 247.

Lerman, J. M.D. Harvard 1927. Research Fellow in Medicine, Harvard Medical School. His subject is: "The Temperature Reaction Following Subtotal Thyroidectomy." Page 254. Address: Massachusetts General Hospital, Boston.

Lynch, Leo J. M.D. Boston University 1925. Medical Staff, Malden Hospital. Urological Staff, Massachusetts Memorial Hospitals. Assistant in Anatomy, Boston University. His subject is: "Pneumococcus Meningitis with Recovery." Page 256. Address: 162 Ferry Street, Malden, Mass.

Tobey, James A. B.S., LL.B., M.S., Dr. P. H. Massachusetts Institute of Technology 1927. Director of Health Service, The Borden Company, New York. His subject is: "Public Health Administration in Maine." Page 258. Address: 350 Madison Avenue, New York, N. Y.

Trask, James D. Ph.B., M.D. Cornell 1917. Associate Professor of Pediatrics, Yale University School of Medicine. Associate Pediatrician, New Haven Hospital. His subject is: "The

Diagnosis and Treatment of Hay Fever." Page 268. Address: New Haven Hospital, New Haven, Conn.

SISE, LINCOLN F. A.B., M.D. Harvard 1901. Anesthetist, Lahey Clinic. Consulting Anesthetist, New England Deaconess Hospital, Anesthetist, New England Baptist Hospital. Visiting Anesthetist, Lawrence Memorial Hospital. Address: 605 Commonwealth Avenue, Boston. Associated with him is:

WOODBRIDGE, PHILIP D. A.B., M.D. Harvard 1921. Anesthetist, Lahey Clinic. Address: 605 Commonwealth Avenue, Boston. Their subject is: "Progress in Anesthesia." Page 272.

THE BOSTON MEDICAL LIBRARY

MEDICAL ETHICS

THE laity have, as a rule, very little appreciation of what is connoted by the word ethics as used by the medical profession, and are apt to refer to it slightingly or in terms of ridicule. If they only stopped to think, it would become obvious that in common with business and most other professions, it is essential for the maintenance of comfortable and efficient relations between patient and doctor and between the doctor and his fellow practitioners that there should be some common standard of conduct which shall tend to secure this end. The medical profession happens to have formulated its conception of what best accomplishes this considerably earlier than any other group of professional men and rather more elaborately. The first formal ethical statement of any sort was contained in the Oath of Hippocrates and therefore is of the date of approximately 500 B.C.

Doubtless the fundamental reason for any and all "codes" rests upon the fact that primitive man had to fight for all he annexed whatever it might be, food, shelter, his wife, property or land and even the right to exist at all. Gradually as he worked his way up from this state of society he learned to be governed and later to govern, in accord with certain prescribed principles, and later still, by specific rules of conduct regulating the usual relations of life. As civilization becomes more complex, it has been found that the enunciation of fundamental principles is not enough; in addition there must needs be rules, enacted into law, and now it is probable, we have too little appreciation of *ethical principles* and are too much encumbered by a body of statutes which are burdensome and beyond the power of the State to enforce in many instances.

In primitive times when men had reason to feel that their honor had been affronted, they settled the matter without reference to any interest that society might have in the issue, as man to man. This was after society had formulated certain tribal laws which established tribal or communal rights to property, life, etc. Later on such matters were attended to in the "Lists" but under some semblance of regulation and out of this was derived eventually the Duel, an institution even now occasionally, even in so-called civilized countries, appealed to by those who feel that the Common Law does not provide a proper redress for a grievance against honor. At the height of its popularity the "Duello" was hedged about by a body of rules embodied in the so-called "Code" which was scrupulously observed.

It might perhaps be pertinent to enquire what necessity obtains for having any other ethical code for the medical profession than that compassed by the Golden Rule. There is no reason except that the relation of physician to patient is so intimate oftentimes that it is well to safeguard both by an elaboration of the fundamental principle of the Golden Rule.

If a high sense of honor is not the possession of a physician; if he is not actuated in all his relations to those who become his patients by the strictest uprightness and propriety; if he is not considerate of the sensibilities of confreres and fails to conduct himself toward them in accordance with the most exacting interpretation of the tenets of the ethical code in force in his community, then the confidence of the public in him will be undermined and the profession itself will suffer, as a whole and individually, because jealousies, bickerings and back-biting will inevitably result. Where this occurs the professional ideals and standards of the community will be low and the public will suffer in the quality of service it receives.

Codes of ethics therefore are a tacit recognition of the common frailties of the human species, one of the most conspicuous of which is the tendency to take advantage of one's fellow man. Whenever a code is promulgated by the "Fathers of Medicine," it is an attempt to curb these tendencies and to cultivate that harmony among physicians as a class which shall in turn inspire the public with confidence in the integrity and honor as well as the skill of the profession caring for its health.

One of the greatest dangers that confronts the profession of medicine at the present time is the danger of commercialism. We are living at a time when the passion for *spending* money has reached an inordinate degree. This means that it must be *gotten* if it is to be *spent*. The material out of which doctors are made is no different than that used in making the general run of mankind and it would be strange indeed if they were able to keep aloof, wholly, from the trend of the times. It is not that the doctor should not gain, if he can do so legitimately through the exercise of superior skill or insight, a competency or more,—provide for his family as well as those do in whose society he mingles and enjoy the benefits that come from the ac-

quisition of such pecuniary rewards as he may be able to command and lay aside an amount suitable for a comfortable old age, but it is that in procuring these desiderata he should not stoop to measures which drag the ideals of a profession that has long stood for unselfishness, sacrifice and devotion to duty at all times, down into the mire of sordid, commercial rivalry. George Sands has somewhere said that "the more she saw of men the better she liked dogs". It would be a sad commentary upon the medical profession if such a criticism should be based upon a critic's observation of physicians, as a class. It is adherence to the idealism begot of the observance of an ethical code that can save us from such opprobrium. From time immemorial men, i.e., men of our profession, have feared that ethical standards were deteriorating. In Tolstoi's Kreutzer Sonata he undertakes to show that professional honor is a thing of the past. In the sixteenth century, Mumford says, that "Medical practitioners seem to have recognized a code not dissimilar from that of a modern life insurance agent. In the 17th century the rare man of real scientific attainment was commonly an object of professional distrust, hatred and slander." Perhaps we are not worse off than they were in the sixteenth and seventeenth centuries. It is "beside the mark" to say that we are no worse than were the practitioners in those days. We *should* be so much better. The fact that we are no *better* is really equivalent to an admission that we are really *worse*. There is said to be "honor among thieves". If medical practice is to become further commercialized there is some chance that this aphorism may be paraphrased to read that there "*may* be honor among doctors".

We feel keenly the tendency sometimes noted in amateur sport, for example in our college athletics, for the participants to depart from established methods of recruiting a team. We recognize an ethical code in such matters. Even in *professional* sport the threat is not infrequently heard that public support will be withdrawn and a national pastime like professional baseball will fall into unpopularity because of the unethical conduct of players and manager. How trivial such a circumstance would be (and public opinion would not permit of such a lapse) as compared with what would happen, and what there is some ground for thinking *is* actually happening, because a not inconsiderable element in the ranks of the medical profession are becoming lax in their adherence to the ethical code which has for so many years governed its conduct.

There is no disposition to ignore the fact that times have changed since the Hippocratic oath was promulgated but in such matters as are dealt with in that oath, there is no more reason for its modification to suit changing times than there would be in the case of the Golden Rule. Such principles are basic and unalterable and should just as certainly and completely actuate the conduct of a physician today as in B.C. 463 and the willingness to be governed by such a code, as much as the nature of the rôle which a physician fills in the life of the community, has been responsible for the respect and admiration in which the calling of the doctor has been held throughout the ages.

The conscienceless attitude of some doctors in the matter of fees where they feel that they may be exacted, particularly among the specialist class, is doing more than perhaps anything else to taint the profession with the odor of charlatanism and lead the public to regard the doctor in the light of an extortioner who makes capital a necessity of life to promote his own interests.

In a measure the public's willingness to accept the services of the poorly educated physicians, the quack and all sorts of irregular practitioners may be ascribed in part at least to the tendency of many specialists to be exorbitant in their demands for pecuniary reward.

Literature with reference to Medical Ethics may be found in the Boston Medical Library.

MISCELLANY

TUBERCULOSIS ABSTRACTS

A view quite generally held by the public and all too often encouraged by physicians is that tuberculosis does not occur in old age. Osler called attention to the surprising prevalence of the disease in the aged, particularly in institutions. He noted that it is usually latent and runs a slow course, and that the diagnosis may easily be overlooked because of the emphysema and coëxisting bronchitis which mask the symptoms of the underlying tuberculosis. In a recent article, Myers and Anderson epitomized the literature on tuberculosis among older persons and reported 37 cases of frank pulmonary tuberculosis in men and women from 50 to 80 years of age. Abstracts from this article follow.

TUBERCULOSIS AMONG THE AGED

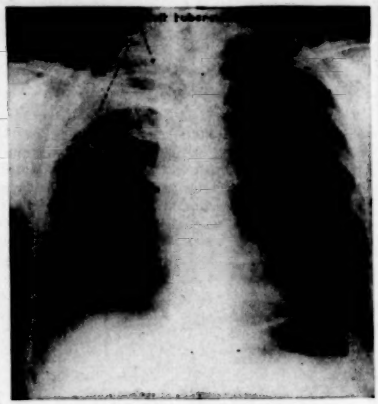
Tuberculosis in people between the ages of 50 and 90 years may be of all types that are ordinarily seen in the earlier years of life, but the chronic indurative and ulcerative types seem to predominate. Taubert found tuberculous caries, meningitis, and miliary disease, and Schurmann reported a recent primary complex, in addition to an old primary complex, in the lung of a man 72 years old. Fried reports a case 59 years of age with tuberculosis of the lung hilum, which resulted in death.

SYMPTOMS AND PHYSICAL SIGNS

Although anatomically the tuberculous process in the aged may be very extensive, it is clinically mild, and symptoms are frequently entirely absent. Night sweats, fever, and hemoptysis are rare. The

patient may experience some dyspnea on exertion. Usually, there is cough of long standing, but expectoration is likely to be absent. In most cases, the symptoms are those commonly attributed to emphysema, chronic bronchitis, or cardiac changes.

Physical signs also may be slight or absent; even râles are rarely elicited. Auscultation is difficult because the signs of emphysema overshadow those of tuberculosis. The x-ray is a valuable aid; in fact, it is often the only means of making the diagnosis. The tuberculin test, as Krause says, is the only pro-



Age 70 years. Pulmonary tuberculosis diagnosed soon after attack of pneumonia 45 years ago. Roentgenograph taken July, 1928.

cedure which, unassisted, can settle a diagnosis of tuberculosis, though only in a negative way. It should be done, therefore, in every case, for if negative, tuberculosis may be confidently excluded. Tubercle bacilli should be searched for. Goldman and Wolff examined routinely the sputum of institutional patients and found bacilli in 2% of 339 aged people, none of whom was suspected of having tuberculosis.

THE DANGERS

The aged patient himself has little to fear from the tuberculous condition, but the danger to his associates is great. Numerous cases of children having become infected and diseased through exposure to grandparents or other elderly members of the family are on record. The hazard is all the greater because usually tuberculosis is not suspected, and the usual precautions are not taken.

A case is cited:

In a luxurious home in Paris, father and mother in the best of health and with excellent past histories, three boys, one after the other, almost at the same age, died of tuberculous meningitis. Investigation led to the governess, more than 60 years old and a sufferer from chronic bronchitis, emphysema and asthma, which proved to be a case of torpid, senile tuberculosis. She was detached from the family. Nothing else in the home was changed. Subsequently two children were born and nursed exclusively by the mother. "One is now approaching 30 years, the other is a superb girl of 25 years."

TREATMENT

A radical change in the habits and mode of life of the aged tuberculous person is probably not advisable. Teaching them to prevent the spread of their disease is the most important requirement. If the disease is unilateral, artificial pneumothorax may render the sputum negative and thus make them fairly safe associates.

SUMMARY

The authors, from their review of literature and studies of their own cases, make the following conclusions:

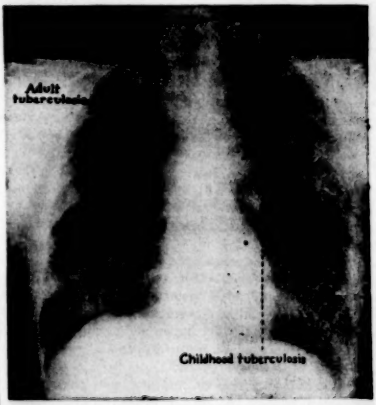
1. Thirty-seven cases of frank pulmonary tuberculosis in men and women ranging from fifty to eighty years are reported.

2. In 9 cases, there had been definite exposure to tuberculosis, usually to members of their families in early life.

3. Among the children and grandchildren of these 37 men and women, tuberculosis is known to exist in thirteen cases. It has been impossible to examine more than a few of the children and grandchildren.

4. The symptoms in the aged cases dated from six weeks to approximately forty-five years before we saw the patients. In 6 cases, hemorrhage was the first symptom, and in 5 others it has occurred during the course of the disease. Pleurisy was the first symptom in six cases. Cough, frequent colds, bronchitis, and catarrh were the first symptoms in 20 cases.

5. On physical examination, all signs were



Age 63 years. Both childhood and adult types of tuberculosis present.

elicited from those of the most advanced disease to those of a normal chest.

6. Tubercle bacilli were demonstrated in 21 cases. We are cognizant of the fact that a negative finding on a few examinations in the remaining cases is of no significance.

7. The cutaneous tuberculin test is of great value in chest work among the aged. Some have not been infected, others have "burned out" their infections; therefore, a negative test is of great significance.

8. X-ray film examination should be made in every case. Without it, many frank cases of tuberculosis and other chest diseases will remain undiagnosed.

9. In treatment, such a high degree of conservation is not necessary as is practiced among young adults. When the disease in unilateral and progressive, artificial pneumothorax may be possible. Even extrapleural thoracoplasty may be indicated in the earlier years of this age-period.

10. Tuberculosis in the aged is one of the great problems from the standpoint of epidemiology. Its danger lies in its mildness. Many cases are not diagnosed until very late in life, and not a few are first diagnosed at the postmortem table.—*Tuberculosis among the Aged, J. A. Myers and H. R. Anderson, Amer. Rev. of Tuberc., April, 1930.*

PHYSIOLOGICAL RESPONSE OF GUINEA PIGS TO ETHYLENE DICHLORIDE VAPOR

The United States Public Health Service, in coöperation with the Bureau of Mines, has conducted certain investigations relating to the effect of the several gases used in household refrigerators. Such investigations relating to ethylene dichloride vapor are of interest. The acute physiological response of guinea pigs exposed to air containing ethylene dichloride vapors was determined. The concentrations of vapor and periods of exposure ranged from those which produced death in a few minutes to those that caused no apparent effect after several hours. The symptoms, gross pathology, and fatality are given, together with a brief discussion of potential health hazards.

In order of occurrence, the symptoms produced in guinea pigs by inhalation of ethylene dichloride vapor are eye and nose irritation, vertigo, static and motor ataxia, retching movements, semiconsciousness and unconsciousness accompanied by uncoördinated movements of the extremities, and death if exposure is continued.

The gross pathological findings were hyperemia, congestion and edema of the lungs with secondary degenerative changes in the kidneys. The severity of the pathology increased with the concentration of vapor and duration of exposure. The lung lesion was the most prominent and probably the greatest causative factor in death.

The summarized physiological response given in the four degrees usually reported are: 10 to 20 per cent. kills in a few minutes; 0.4 to 0.6 per cent. dangerous in 30 to 60 minutes; 0.35 per cent. maximum amount for 60 minutes without serious disturbances; 0.1 per cent. slight symptoms after several hours or maximum amount without serious disturbances.

A comparison of the results obtained with those reported in the literature for other compounds indicates that for single exposures and periods of an hour or more the toxicity of ethylene dichloride appears to be of about the same order as gasoline, benzene, carbon tetrachloride, and chloroform. For periods of less than an hour it is less toxic than these compounds.

The odor of ethylene dichloride is distinct and noticeable, and warning symptoms are produced by relatively safe concentrations.—*Bulletin United States Public Health Service.*

WEEKLY HEALTH INDEX

Telegraphic returns from 65 cities with a total population of thirty million for the week ending July 26 indicate a mortality rate of 12.6 as against a rate of 10.8 for the corresponding week of last year. The highest rate (39.5) appears for San Antonio, Texas., and the lowest (3.6) for Somerville, Mass. The highest infant mortality rate (181) appears for Camden, N. J., and the lowest for Lowell, Mass., Somerville, Mass., and Tacoma, Wash., which reported no infant mortality.

The annual rate for 65 cities is 13.1 for the thirty weeks of 1930, as against a rate of 13.9 for the corresponding weeks of 1929.

Reports from several cities indicate that excessive heat has been responsible for the increase in the mortality rates reported.

BOAL'S ROLLS CORPORATION

Washington, D. C., July 25, 1930 (F.T.C.)—A Chicago medicine manufacturer producing what are known as "Boal's Rolls" is enjoined by the Federal Trade Commission from representing that this medicine prevents constipation or influenza, and that it is a fruit laxative.

Boal's Rolls Corporation, the respondent in the case and manufacturer of the medicine, advertised that its remedy would prevent constipation and influenza and was a "delicious fruit laxative composed of figs and other fruit".

The Commission notes in its findings that the "laxative properties of the respondent's product are not due to a fruit ingredient, but to the presence therein of phenolphthalein, cascara, and senna, nor is the said product a preventative of constipation and influenza".—*National Better Business Bureau, Inc., Commercial Department.*

CEASE AND DESIST ORDER AGAINST STRANSKY

Washington, D. C., July 26, 1930 (F.T.C.)—Advertising in connection with the sale of a "vaporizer and decarbonizer" for automobiles that Ford cars run fifty-seven miles on a gallon of gasoline is prohibited in an order of the Federal Trade Commission to J. A. Stransky and L. G. Stransky,

copartners trading under the name of J. A. Stransky Manufacturing Company at Pukwana, South Dakota.

Among other phrases contained in the company's magazine advertising was the following:

> "Five hundred dollars per month selling a new patented fuel vaporizer guaranteed to save up to fifty per cent. in gasoline; forty miles per gallon made with Ford cars."

Representations made by the company were found to be exaggerated beyond what was possible of accomplishment as a result of the use of the "vaporizer and decarbonizer" device, and statements to the effect that the device would remove carbon, prevent spark trouble and overheating, and make engines start easier, were found not to be substantiated in fact.—*National Better Business Bureau.*

CORRESPONDENCE

THE ANXIOUS MOTHER AND THE CHILD WITH AN ACUTE THROAT INFECTION

Mr. Editor:

Some of your readers may remember Ricord's infallible prescription for acquiring a Neisser infection.

A paraphrase, in connection with the title of this letter would read something like this: Take one anxious mother, and one child of six years, with a red throat. The anxious mother, anxious to "Nip it in the bud," swabs out the child's throat and nares with a ten per cent. solution of a well known silver salt. This is repeated every two hours, for three doses. The child coughs, gags and spits. The pharynx is traumatized, and likely bleeds.

Dans le matin prochain, si l'enfant na pas attrapez une angine maligne de la gorge, c'est que Dieu le garde!

Yours truly,

WM. PEARCE COUES, M.D.

Prouts Neck, Maine,
July 31, 1930.

NEWS ITEMS

REMOVALS—Dr. Emilio D'Errico wishes to announce the removal of his office from 201 Bay State Road to 27 Bay State Road, Boston.

Dr. Edward C. Messer announces the removal of his office from 159 South Street, Jamaica Plain to 584 Centre Street, Jamaica Plain.

SOUTHBRIDGE, MASSACHUSETTS TO HAVE A HOSPITAL—A campaign to raise money to build and endow a hospital in Southbridge, Massachusetts was carried to completion more than a month ago.

The movement was supplementary to the offer made by Mr. and Mrs. Charles D. Harrington that if the town of Southbridge would raise an equal amount a gift of one hundred and fifty thousand dollars would be forthcoming.

The town committee was augmented by committees in Charlton, Sturbridge and Fiskdale making a group of over three hundred men and women dedicated to the task of securing the necessary funds.

Two hundred and thirty-one thousand one hundred and sixty-six dollars was raised by these committees.

This assures Southbridge and adjacent towns a community hospital which will be of great benefit to that region.

This is another demonstration of the power of a hospital appeal to stimulate charitable gifts.

NOTICES

On the cover of the issue of July 31 appears "Volume 203, Number 6". It should have read "Number 5". The correct number appears inside and if anyone wishes to have it correct on the outside, we will furnish stickers.

CONDITIONS IN WEST MEDWAY

On the advice of a resident in West Medway, a notice was published in the *Journal*, stating that there was an opening for a physician in that town.

We are informed on good authority that there is no real vacancy and that financial conditions in that town are not especially good.

NOTICE OF MEETING

THE INTERNATIONAL ASSEMBLY OF THE INTERSTATE POSTGRADUATE MEDICAL ASSOCIATION OF NORTH AMERICA

The International Assembly of the Interstate Postgraduate Medical Association of North America will hold its next meeting in Minneapolis, Minn., Oct. 20, 21, 22, 23 and 24, 1930.

A program of unusual excellence has been prepared. The list of speakers appears below.

ABELL, DR. IRVIN	Clinical Professor of *Surgery*, University of Louisville, Louisville, Ky.
ABT, DR. ISAAC A.	Professor of *Pediatrics*, Northwestern University Medical School, Chicago, Ill.
ADSON, DR. ALFRED W.	Associate Professor of *Surgery*, University of Minnesota Graduate School of Medicine, Rochester, Minn.
ALLISON, DR. NATHANIEL	Professor of *Orthopedic Surgery*, Harvard University Medical School, Boston, Mass.
BALFOUR, DR. DONALD C.	Professor of *Surgery*, University of Minnesota Graduate School of Medicine, Rochester, Minn.
BARKER, DR. LEWELLYS F.	Professor Emeritus of *Medicine*, Johns Hopkins University School of Medicine, Baltimore, Md.

BARR, DR. DAVID P.	Professor of *Medicine*, Washington University School of Medicine, St. Louis, Mo.
BAZIN, DR. ALFRED T.	Professor of *Surgery*, McGill University, Faculty of Medicine, Montreal, Quebec, Can.
BENNETT, DR. GEORGE E.	Associate Professor of Clinical *Orthopedic Surgery*, Johns Hopkins University School of Medicine, Baltimore, Md.
BEVAN, DR. ARTHUR DEAN	Professor of *Surgery* and Head of the Department of Surgery, Rush Medical College, University of Chicago, Chicago, Ill.
BLAND, DR. PASCAL B.	Professor of *Obstetrics*, Jefferson Medical College, Philadelphia, Pa.
BRAASCH, DR. WILLIAM F.	Professor of *Urology*, University of Minnesota, Graduate School of Medicine, Rochester, Minn.
BROOKS, DR. HARLOW H.	Professor of Clinical *Medicine*, University and Bellevue Hospital Medical College, New York, N. Y.
BROWN, DR. ALAN	Associate Professor of *Medicine*, (*Pediatrics*) University of Toronto Faculty of Medicine, Toronto, Ontario, Canada.
BROWN, DR. GEORGE E.	Associate Professor of *Medicine*, University of Minnesota, Graduate School of Medicine, Mayo Clinic, Rochester, Minn.
BURCH, DR. FRANK E.	Professor of *Ophthalmology* and Chief of the Department of Ophthalmology and Oto-Laryngology, University of Minnesota Medical School, Minneapolis, Minn.
CABOT, DR. HUGH	Consulting *Surgeon*, Mayo Clinic, Rochester, Minn.
CASTLE, DR. WILLIAM B.	Assistant Professor of *Medicine*, Harvard University Medical School, Boston, Mass.
CHRISTIAN, DR. HENRY A.	Professor of the Theory and Practice of *Physic*, Harvard University Medical School, Boston, Mass.
CHRISTIANSON, HON. THEODORE	Governor, Commonwealth of Minnesota.
CLAIRMONT, DR. PAUL	Head of the Department of *Surgery*, Medical Department, University of Zurich, Zurich, Switzerland.
COFFEY, DR. ROBERT C.	Clinical Professor of *Surgery*, University of Oregon Medical School; Director, Coffey Clinic, Portland, Ore.
CRILE, DR. GEORGE W.	Surgeon, Cleveland Clinic; Director of Cleveland Clinic Foundation; Professor Emeritus of *Surgery*, Western Reserve University School of Medicine, Cleveland, O.
CUMMING, DR. HUGH S.	Surgeon-General, U. S. Public Health Service.
DANDY, DR. WALTER E.	Associate Professor of Clinical *Surgery*, Johns Hopkins University School of Medicine, Baltimore, Md.
DEAVER, DR. JOHN B.	Emeritus Professor of *Surgery*, University of Pennsylvania School of Medicine, Philadelphia, Pa.
DE LEE, DR. JOSEPH B.	Professor of *Obstetrics*, Northwestern University School of Medicine, Chicago, Ill.
ELLIOTT, DR. CHARLES A.	Professor of *Medicine*, Northwestern University School of Medicine, Chicago, Ill.
ERDMANN, DR. JOHN F.	Professor of *Surgery*, New York Post-Graduate Medical School, New York, N. Y.
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SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

March-October—International Medical Postgraduate Courses in Berlin. Complete notice appears on page 853, issue of October 24, 1929.

August 13—Greater Boston Medical Society. Complete notice appears on page 194, issue of July 24.

September 8-12—Postgraduate week of Physical Therapy. Detailed notice appears on page 1025, issue of May 22.

September 14-18—Fifth International Congress on Physiotherapy. Complete notice appears on page 906, issue of October 31, 1929.

September 16-17-18—Clinical Congress of the Connecticut State Medical Society. Complete notice appears on page 194, issue of July 24.

September 26-27—New England Surgical Society. Detailed notice appears on page 1028, issue of May 22.

October 13-17—Clinical Congress of the American College of Surgeons. Complete notice appears on page 1175, issue of June 12.

October 20-24—International Assembly of the Interstate Postgraduate Medical Association of North America. Detailed notice appears on page 291.

October 27—The American Public Health Association. Detailed notice appears on page 1271, issue of December 19, 1929.

March 23-27, 1931—Fifteenth annual clinical session of the American College of Physicians. Detailed notice appears on page 790, issue of April 17.

BOOK REVIEWS

Traitement Médical des Affections Stomacales (Collection Médecine et Chirurgie pratiques). Par LEON-MEUNIER. Masson et Cie, Libraires de L'Academie de Médecine. Paris. 212 pages illustrated. 22 fr.

This small volume is of interest for two reasons. First, it advances plausible theoretical considerations some of which have not gained general attention in this country. Second, it describes methods of treatment in an admirably specific and practical manner. The first point emphasized is that many symptoms of dyspepsia depend for their relief upon the promotion of evacuation of the stomach, and that evacuation of the stomach is favored when its contents reach the cryoscopic point of —0.38. This is supported by briefly stated experimental evidence. Thus it is advocated that soda and other medicaments should be given only in solutions having a cryoscopic figure of —0.38. This requirement is met by a solution of bicarbonate of soda 9 grams in 1000 c.c. of water, or by sodium chloride 5.5 grams per 1000 c.c. In modifying gastric acidity the author urges that the chief reliance be placed upon regulating the degree to which the sense of taste is stimulated by articles of diet. He warns against frequent and habitual use of alkalies as capable of stimulating the stomach to increased secretion. In preference he advises the use of protective suspensions of carbonate of bismuth or of kaolin, 20-30 grams in 100 c.c. of water as a daily dose, to be taken in five divisions at hours when the stomach is empty. Other methods from 24 hours of fasting in each week to gymnastic exercises are described. Of considerable practical value are the numerous recipes for the preparation of foods which may be included in the diets recommended.

Thérapeutique Médicale. I. Maladies du Tube Digestif. Par MAURICE LOEPER, Professeur de Thérapeutique a la Faculté de Médecine de Paris, Médecin de l'Hopital de la Pitié. Avec la collaboration du DR. ANDRE LEMAIRE, Chef de Laboratoire a la Faculté. Masson et Cie, Libraires de L'Académie de Médecine. Paris. 372 pages illustrated. 50 fr.

This volume, composed of 26 chapters, discusses certain disorders of the alimentary tract, from infections of the mouth to disorders of the rectum. It opens with a gracefully written outline of the history of therapeutics in ancient and mediaeval times as a background for the general principles to be applied today. This introduction is perhaps the most successful part of the volume, for as one reads the following chapters the impression increases that the discussions of the successive subjects are far from satisfying. Although the book is not a small one it contains so many subdivisions that each subject is covered only in a cursory manner. There is also a lack of explicitness which detracts from its practical usefulness. For instance, in the treatment of gastric ulcer none of the several diets mentioned are described in sufficient detail to enable a reader to prescribe them. Vaccine treatments, hypodermic injections of pepsin, diathermy and mesothorium are favored, but supporting evidence and details of the methods are not given.

Many drugs are mentioned for different purposes. Not a few are substances which do not appear in our pharmacopeia, at least under any similar names, such as jusquiame and gardénal. Other substances which are seldom used in this country, such as valerian, are given more prominence than we accord them. The final chapter deals with the different classes of mineral waters and considerations according to which a patient may be advised to visit one or another spring.

The Diabetic Life. By R. D. LAWRENCE, M.A., M.D., M.R.C.P. 5th Ed., 1930, P. Blakiston's Son and Company, Philadelphia, 204 pages. Price $2.50.

This excellent manual of diabetic treatment for physicians and patients has been reviewed in a previous edition in the *Journal*. The present edition includes a number of new practical points, among which may be mentioned the use of the new food analyses by McCance and Lawrence. These analyses indicate that the available carbohydrate in many vegetables is less than was once supposed and therefore larger amounts are allowed. However, it should be remembered that a given analysis at best represents only an average of values and that the variation in carbohydrate content of vegetables and fruit is so great at different seasons and in different localities that slight differences in analytical figures may well be forgotten.

The blood sugar is considered within normal limits unless it exceeds 0.13 per cent. fasting or 0.20 per cent. after food. In American studies a blood sugar exceeding 0.17 per cent. after food has usually been considered indication of diabetes.

As in other manuals, a simplified scheme of diets intended to reduce complications is given, called the "Line-Ration" diet scheme. Mild cases often do not need weighed diets. The moderate, severe, or any cases given a "Line-Ration" diet would appear to receive diets relatively low in carbohydrate, that is rarely exceeding 50 to 75 grams. (Such a diet might in some cases be equivalent to one of 80 to 100 grams, using the older tables of analyses.) The most recent American work indicates that diets much higher in carbohydrate and with less fat are preferable. Dr. Lawrence conservatively tries to keep his insulin dosage within the range of 10 to 40 units daily.

Excellent descriptions of the technique of insulin administration, and the recognition and treatment of hypoglycemia are given. In the treatment of coma the importance of early use of insulin is stressed, but some reliance is placed on the use of soda bicarbonate. Adequate attention is given to the treatment of such complications as pregnancy, gangrene, surgery, and acute infections. The last 75 pages are devoted to the management of the diet with numerous recipes, rules of cooking and menus.

This manual has already been translated into Spanish and French and should be helpful to anyone interested in the treatment of diabetes.